A MONOGRAPH OF THE LIVING WORLD GENERA AND AFROTROPICAL SPECIES OF CYATHOLIPID SPIDERS

(ARANEAE, ORBICULARIAE, ARANEOIDEA, CYATHOLIPIDAE)

By

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A MONOGRAPH OF THE LIVING WORLD GENERA AND AFROTROPICAL SPECIES OF CYATHOLIPID SPIDERS (ARANEAE, ORBICULARIAE, ARANEOIDEA, CYATHOLIPIDAE)

by

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A phylogenetic analysis and monograph of the living world genera and Afrotropical species of Cyatholipidae is provided. Notable biogeographic patterns in the family include: 1. the Australian and New Zealand faunas are not closely related, 2. the fauna of the Cape region of South Africa is largely distinct from that of the remainder of the continent, and 3. at least two monophyletic groups show disjunctions between Madagascar and the mountains of east Africa. The following new taxa are proposed: *Buibui*, new genus, including the new species *B. abyssinica*, *B. kankamelos*, *B. cyrtata*, *B. claviger*, and *B. orthoskelos*; *Ilisoa conjugalis*, new species; the new species *Isicabu henriki*, *I. kombo*, and *I. margrethae*; *Kubwa singularis*, new genus and species; *Lordhowea nesiota*, new genus and species; *Pembatata* new genus including the new species *P. embamba*, *P. gongo*, and *P. mafuta*; *Pokennips* new genus; *Ubacisi* new genus; the new species *Ulwembua usambara* and *U. nigra*; *Umwani*, new genus, including the new species *U. artigamos* and *U. anymphos*; and *Uvik vulgaris*, new genus and species. The following new combinations are proposed: *Pokennips dentipes* (Simon) for *Cyatholipus dentipes* Simon 1894 and *Ubacisi capensis* (Griswold) for *Isicabu capensis* Griswold 1987.

Introduction

The Cyatholipidae comprise diverse faunas in the cool-temperate southern latitudes of Africa (Griswold 1987c) and Australasia (Forster 1988) and are widely distributed in tropical montane forests at least in Africa. They are typical denizens of, and largely restricted to, the "Afromontane" forests (White 1978; Griswold 1991a) making up the "Afromontane archipelago." A phylogeny for this family should provide crucial evidence on the age and mode of origin of this strikingly disjunct biota. In this, the 13th in a series of papers monographing the spider fauna of the Afromontane archipelago (Griswold 1985, 1987a, 1987b, 1987c, 1990, 1991b, 1994, 1997a, 1997b, 1998a, 1998b; Griswold and Platnick 1987), I revise the world genera of Cyatholipidae. This in turn provides the phylogenetic context for a detailed monograph and phylogeny of the Afrotropical Cyatholipidae.

The phylogenetic analysis is integral to this monograph, especially to the definition and proposal of genera. Using Synotaxidae as the outgroup hypothesis (Griswold et al. 1998), I propose a cladogram for representatives of all world genera and a comprehensive sample of Afrotropical species. Assignment of the Afrotropical species to genera is based upon this cladogram. Several genera are necessarily monotypic: these taxa are sister groups of well-defined, easily recognizable clades of several species. To define genera more broadly to eliminate monotypy would have required that these more inclusive groups be extremely difficult to diagnose.

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This monograph is based upon the study of 2,196 cyatholipid specimens representing extant material from Africa, Australia, Madagascar, and New Zealand, and amber fossil material from Germany and the Baltic. I diagnose and provide a key to all the living genera and Afrotropical species. The living taxa comprise 23 genera, of which eight are herein newly described. The Afrotropical fauna comprises 45 species, of which 18 are newly described. I also summarize our knowledge of cyatholipid morphology and natural history and examine the biogeography of species and higher clades.

Taxonomic History

Discovered in New Zealand and southern Africa in the 19th century, cyatholipids remained poorly known for most of the next 100 years. The first cyatholipid was described from New Zealand by Urquhart (1889) as the linyphiid *Linyphia nemoralis*. He later described a second New Zealand species also as a linyphiid: *Tekella absidata* (Urquhart 1894). Simon (1894) was the first to recognize that these spiders constituted a distinct family-level group, establishing the Cyatholipeae in the Tetragnathinae to accommodate three species of his new genus *Cyatholipus*. Cambridge (1903) described *Moero quadrimaculata* from South Africa, unaware that Simon had described this species 10 years previously as *Cyatholipus quadrimaculatus*. For most of this century the family remained poorly known, though Bryant (1933) recognized the familial affinity between *Tekella* and *Cyatholipus*, placing these genera in the Theridiosomatinae. With the recent increase in interest in the biota of the southern continents that comprise the former Gondwanaland, Cyatholipidae once again came under scrutiny. Nearly simultaneously, two new genera were described from Queensland, Australia. Wunderlich (1978) described *Tekellatus* as a tetragnathid. Davies (1978) described *Teemenaarus* in her new family Teemenaaridae, also placing *Tekella* and *Cyatholipus* in this family. She also described the cyatholipid's unique posterior respiratory system. Platnick (1979) pointed out that because Simon (1894) had used Cyatholipeae as a family level name, Cyatholipidae must take priority over Teemenaaridae. The first indication of the richness of the Afrotropical cyatholipid fauna came with my 1987 paper (Griswold 1987c) in which 12 new species and three new genera (*Isicabu*, *Ilisoa* and *Ulwembua*) were described from South Africa. The first attempt at a comprehensive treatment of the family was that of Forster (1988) who examined taxa from Africa, Australia and New Zealand. He produced a detailed account of their morphology and described the new genera *Hanea* and *Tekelloides* from New Zealand and *Matilda* and *Toddiana* from Australia. The possibility that cyatholipids had a wider distribution in the past arose with the work of Wunderlich (1993) who attributed three species from Baltic amber to this family. My recent work has focussed on the tropical African cyatholipid fauna, describing new taxa from Madagascar (Griswold 1997a), east Africa (Griswold 1997b) and west Africa (Griswold 1998a).

Materials and Methods

CONVENTIONS. — On the cladogram all nodes were assigned a letter (e.g., A, BB). Throughout the discussions of the phylogenetic analysis and relationships among taxa these letters are used to refer both to nodes on the cladogram (e.g., node P) and clades distad to that node (e.g., clade P, comprising *Tekella* and *Tekelloides*). Throughout the text, figures cited from previous papers are listed as "fig.," those appearing in this paper as "Fig." Anatomical abbreviations used in the text and figures are listed in Table 1. All illustrations are by Jenny Speckels (JS) or myself (CG) and are attributed in the figure captions.

SPECIMEN PREPARATION. — Male palpi were expanded by immersing them overnight in a 10–15% solution of potassium hydroxide (KOH) and transferring them to distilled water where expansion continued. Palpi were transferred back and forth between KOH and distilled water until expansion stopped. Vulvae were cleaned by exposure to trypsin, bleached in "Clorox" household bleach (5.25% sodium hypochlorite), stained with Chlorazol Black, and mounted in Hoyer's Medium for examination and photography. Small structures were examined in temporary mounts following the procedure described in Coddington (1983). Examination was via Wild M5Apo, Olympus SZH10, Leica MZApo and Leitz Ortholux II microscopes. Spinneret preparations were obtained most reliably when animals were quick-killed by sudden immersion in boiling water. Extension of the spinnerets provided a clear view of all spigots. If live material was unavailable, clean museum material was chosen; the specimen was ultrasonically cleaned, the abdomen was squeezed with forceps to extend and separate the spinnerets (Coddington 1989:73) if necessary, and the specimen was passed through changes from 75% to 100% ethanol. Prior to examination with a Hitachi S-520 or Cambridge Stereoscan Scanning Electron Microscope (SEM) all structures were critical-point dried.

DESCRIPTIONS. — Each genus is fully described. For Afrotropical genera the description summarizes all included species: for other genera the description reflects the type species. Type species of all genera, and type specimens of all Afrotropical species were examined. At the head of each generic description generic monophyly and relationships are discussed by reference to characters from the cladogram (Figs. 18–20). For new species I provide a full description and list of material examined; described species are diagnosed, referenced to the original description, and all material studied since that description is listed. All locality records for Afrotropical species are mapped (Figs. 151–159). Species descriptions refer to a single individual of each sex, which is identified either as a type or by the locality at which it was collected. For each sex there is also a section reporting the variation in the most conspicuous and variable features. For variation in quantitative features three to five individuals representing the full range in overall size were chosen to sample the species: the N is reported at the head of each section. My taxon names from Latin or Greek were found

TABLE 1. List of anatomical abbreviations used in the text and figures.

AD	vulval afferent duct	MLT	median lobe of tegulum
AL	apical lobe of tegulum	MS	epigynal median septum
AER	anterior eye row	OAL	ocular area length
ALE	anterior lateral eyes	OQA	ocular quadrangle, anterior
AME	anterior median eyes	OQP	ocular quadrangle, posterior
AT	epigynal atrium	PC	paracymbium
C	conductor	PER	posterior eye row
CB	cymbium	PLE	posterior lateral eyes
CO	copulatory opening	PME	posterior median eyes
E	embolus	PEP	parembolic process
EF	epigastric furrow	RMP	retromedian cymbial process
FD	fertilization duct	S	epigynal scape
HS	spermathecal head	ST	subtegulum
MH	epigynal median hood	T	tegulum
ML	epigynal median lobe	TL	ventromedian tegular lobe

in Brown (1954), from Swahili in Johnson (1939), and from Zulu in Dent and Nyembezi (1969): names derived from other languages (e.g., Bakweri-Cameroon, Malagasy-Madagascar) were field collected from native-speaking informants.

CHARACTER DEFINITIONS. — Criteria for recognizing characters and defining their states are discussed and referenced, if appropriate, under each character below (see Character Data). I presume that all characters are logically independent, although perhaps not biologically. In other words, if variation in a structure is complex enough and sufficiently discrete that a number of comparisons can be made, I included them all. Character systems are represented in the matrix to the extent that comparisons about them can be made.

PHYLOGENETICS. — This is discussed fully in "phylogenetic methodology" under "Phylogenetics" below.

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Natural History

Cyatholipids are typically found in cool, moist tropical montane and temperate lowland forests (Fig. 3A–C, E, G). In the tropics they usually occur above 800 m on mountains, while in the south temperate regions they occur down to sea level. Some species are also recorded from montane shrublands, heaths, and even grasslands (Fig. 3D). Collection records suggest that some species tolerate, or even favor, drier habitats: *Scharffia rossi* was collected on a hilltop in shade beneath tall umbrella acacias with an understory of grass and stones; *Ilisoa conjugalis* and *Pokennips dentipes* have been collected from sand dunes at the cold, moist Cape of Good Hope (Fig. 3F), and the type locality of *Cyatholipus hirsutissimus* in the western Karoo, South Africa, suggests that this species may live under dry conditions.

Cyatholipids may be dominant web building spiders in Afromontane forests. *Scharffia chinja*, *Ulwembua outeniqua*, *Ubacisi capensis*, and *Uvik vulgaris* are numerous in collections, and *Wanzia fako* is one of the three most abundant web builders in forest understory at Mann's Spring, Mount Cameroon (Fig. 3B) (Coddington et al. 1991). As many as three cyatholipid species have been found living in sympatry, i.e., *Isicabu kombo*, *Scharffia chinja*, and *Ulwembua usambara* at Mazumbai in Tanzania. In sympatry one species is typically abundant and others uncommon or rare. For example, three person/weeks of collecting at Mazumbai revealed that *Scharffia chinja* (60 specimens) was far more common than *Isicabu kombo* (17 specimens), which was in turn more common than *Ulwembua usambara* (8 specimens). At least *Cyatholipus* and *Ilisoa* seem always to be rare, with most collections being of one or two individuals.

Most cyatholipid specimens have been collected in forest understory by beating or sweeping or by being taken from webs. Specimens have also been collected in litter, on tree trunks and rock walls, and by canopy fogging. Most collected in litter may have fallen or been knocked from webs, but at least *Matilda* may live permanently in the litter. The absence of aciniform and minor ampullate gland spigots in *Matilda* suggests that these spiders may wander without making webs.

Webs are constructed in tree buttresses, against logs, and in both woody and herbaceous understory vegetation in shaded areas in the forest (Fig. 2A–C; Griswold 1998a, figs. 18, 19; Griswold et al. 1998, fig. 5a, c). Webs comprise a flat, fine mesh main sheet and in most cases an undersheet of a few lines, which is about one-half the length of the main sheet. The main sheet may show signs of repair, with regions showing different thicknesses. During the day most spiders are found hanging beneath the main sheet, near the margin and above the undersheet; during the night spiders hang beneath the center of the main sheet. In addition to juveniles and adult females, adult males may be found in intact webs, and both sexes may occur in the same web. The retention of the "araneoid triplet" may enable the adult males to continue to produce sticky silk webs.

Sexual behavior in Cyatholipidae is unknown, although the presence of adult males in the same web as penultimate females suggests that in some species the sexes may cohabit prior to mating. Copulation has not been observed. Sexual dimorphism in which males have relatively longer legs than females suggests some mating function, as does the occasional modification of male chelicerae (e.g., *Tekellatus* and *Toddiana*) and first legs (e.g., *Toddiana*, *Tekellatus*, *Teemenaarus* and *Pokennips*, some *Isicabu* and *Buibui*). Egg sacs, which contain 4–12 eggs, are spherical, loosely woven, and ornamented with small tubercles (Forster 1988, fig. 5). They may be found at the edge of webs where they are hidden by leaves or camouflaged by debris.

Finally, modifications of the carapace-abdomen interface suggest stridulatory behavior, though such behavior has never been observed. Sclerotization around the pedicel (Fig. 67A), formation of petioles (Fig. 4A, C) or setal base picks anteriorly on the abdomen (Fig. 9C, D), and ridges or carinae on the posterior margin of the carapace (Fig. 4B, C) may function to produce vibration. These modifications are found to some degree in males and females, suggesting that whatever their function, they serve both sexes.

Cyatholipid Morphology

SOMATIC MORPHOLOGY

Cephalothorax. The carapace profile is domed and evenly curved in most taxa (Figs. 31A, 67A) but *Isicabu*, *Scharffia* and *Alaranea* have a profile that is nearly flat (Figs. 51A, 76, 104E). The cephalic region of *Matilda* is much higher than the thorax (Fig. 26A). The carapace of most taxa is heart-shaped to ovoid in dorsal view, but in *Isicabu*, *Scharffia* and most *Alaranea* the carapace is narrowed posteriorly with the lateral margins angular describing a diamond shape; *Scharffia holmi* and *S. rossi* have carapaces that are narrow and parallel sided posteriorly. The posterior margin is truncate to weakly concave in most taxa (Fig. 31B), but that of *Isicabu* is deeply concave and flared at the sides (Fig. 77A). The carapaces of the Australian cyatholipid genera *Lordhowea*, *Toddiana*, *Tekellatus* and *Matilda* are smooth. Carapace texture that is granulate or rugose occurs in the other 19 genera (clade FF on Fig. 18). Many *Ulwembua* have the carapace denticulate posteriorly. The thoracic fovea is inconspicuous: it is reduced to a deep pit or shallow depression, or may be absent. There are eight eyes in two rows, with the anterior row recurved and posterior nearly straight. The laterals are contiguous and situated on a low tubercle. The tapetum is canoe-shaped. The clypeus is vertical and typically smooth and glabrous, though in *Matilda* there is a group of long, stiff, forward pointing hairs. The chelicerae are smooth laterally and lack a boss. In most taxa the chelicerae taper gradually from the base to apex but a large basal protuberance is found in *Tekelloides* (where it is rastellate dorsally; Fig. 48C), *Vazaha*, *Ulwembua ranomafana*, *Pokennips*, and *Isicabu*. The anterolateral spur (Figs. 35, 38A) on the chelicerae of *Tekellatus* and *Toddiana* is unique. The fang furrow typically has two to three small retromarginal teeth and three to four large promarginal teeth (Fig. 5B, C); *Matilda* lacks teeth on the retromargin. The labium is broader than long (Fig. 5D). The sternum is scutiform, weakly rugose to strongly pustulate, and broadly truncate posteriorly (Fig. 4F–H). In most Cyatholipidae and Synotaxidae the leg coxae arise from soft, unsclerotized cuticle. Sclerotized pleural and sternal extensions may be discernible, and may extend as points between the coxae. Fused points that meet to surround the coxae, often forming broad straps or bands or completely enclosing the coxae, occur in *Toddiana*, *Buibui*, *Uvik*, *Wanzia*, *Isicabu*, *Scharffia*, and *Alaranea*.

Legs. Cyatholipid legs are long to very long, slender, and simple in most taxa. The legs are spineless (Figs. 1, 31A) but with dorsal bristles distally on the patellae and proximally on tibiae, and in some species distally on tibiae I and II. As in other Araneoidea the cuticle is squamate (Fig. 6A) and hairs serrate (Fig. 6E). There are two trichobothria dorsally on the palpal tibiae, in most species a proximal retrodorsal trichobothrium and row of two dorsomedians on leg tibiae, metatarsi I–III have one proximal dorsal, and metatarsus IV lacks a trichobothrium; the bothrium may be round and smooth (Fig. 6B) or with a hood faintly indicated by a weak transverse ridge (Forster 1988, fig. 30). The tarsal organ is domed, oval to round, with a small to minute median aperture (Fig. 6A, C); it is located at or just proximad of the tarsal midpoint. The femora may be gracefully yet abruptly expanded near the base (Griswold et al. 1998, fig. 20D) or taper gradually to the base. Forster, Platnick, and Coddington (1990:110) suggested that basally thickened femora might be a synapomorphy for the Synotaxidae, but such femora are variable in both Synotaxidae and Cyatholipidae. There are several leg modifications that are sexually dimorphic and characteristic of only certain taxa. There may be sexual dimorphism in leg length, particularly in leg I. In the extreme example, leg I length of males of *Scharffia nyasa* is 5.4–9.5 times the width of the carapace (Griswold 1997b, fig. 281); that of females is only 3.6–4.7 times carapace width. There may also be modifications of the first (and sometimes second) femur, tibia, and metatarsus. Femur I may be thickened and curved in *Toddiana*, *Tekellatus*, *Teemenaarus* and *Pokennips*. The male tibiae I of *Toddiana*, *Tekellatus*, and *Teemenaarus* may have ventral teeth, and ventral teeth also occur on metatarsi I of *Toddiana*, *Tekellatus*, and *Pokennips*. Bowed male metatarsi I occur in *Teemenaarus* and *Kubwa*, sinuate metatarsi I occur in *Toddiana* and *Isicabu kombo*, and twisted metatarsi I occur in *Buibui abyssinica* and *B. cyrtata*. In *Buibui cyrtata* and *Isicabu kombo* the second metatarsi are also twisted. Swollen metatarsi I occur in *Buibui claviger*, *B. cyrtata*, and *B. abyssinica*, *Kubwa singularis* and *Pembatatu gongo* and *P. mafuta*. The function of these sexually dimorphic leg modifications is unknown. In a few cases sister taxa of those with modified males have unmodified males (i.e., *Isicabu henriki*, *Buibui orthoskelos*, *Pembatatu embamba*) and the females of modified and unmodified species show no differences that might correspond to male modifications. One can only conclude that the modifications relate in some way to mate finding, courtship or mating. The STC have a ventral row of short teeth, and the ITC is short (Fig. 6D), smooth or with a tooth. Serrate "false claws" are present (Fig. 6D; Griswold 1987c, fig. 9; Forster 1988, fig. 22). The female palp lacks a claw (Fig. 6E).

ABDOMEN

External morphology. The abdomen is spherical to ovoid to triangular in lateral view; a triangular abdomen, or at least one that is trapezoidal, is found in most Cyatholipidae. Round abdomens occur in *Matilda*, *Lordhowea*, *Cyatholipus*, *Tekella*, *Umwani*, *Hanea*, *Pokennips* and *Ilisoa*, and in all *Buibui* except *B. abyssinica*. The abdomen may be soft or variously sclerotized. In most species it is sclerotized from the epigastric furrow to the pedicel. Sclerotizations may surround the pedicel and/or spinnerets, and are sexually dimorphic in most taxa with male abdomens typically being more heavily sclerotized than those of females. Sclerotized cuticle forms a ring surrounding the male pedicel in *Alaranea*, *Cyatholipus*, *Ilisoa knysna*, *Isicabu* (with exceptions), *Lordhowea*, *Matilda*, *Scharffia*, *Tekella*, *Tekellatus*, *Toddiana*, *Teemenaarus*, *Uvik*, *Umwani*, and *Wanzia* and in *Ulwembua usambara* and *U. pulchra*. Prolongation of this sclerotized ring into a petiole is found in *Matilda*, *Teemenaarus*, *Wanzia*, most *Isicabu*, and in *Scharffia* and *Alaranea*. In most taxa the petiole is smooth (Figs. 31A, 147), but the petioles of *Scharffia* (Fig. 4A) and *Alaranea* are annulate and the petiole of *Alaranea* has the anterior-most annulus modified dorsally into a small horn or projection (Fig. 4C). The function of these sclerotized petioles is unknown, though they may play a part in a carapace/abdomen stridulatory mechanism like that reported from the Synotaxidae (Forster et al. 1990). Some cyatholipids have abdominal scuta. *Matilda* has dorsal, ventral, and circum-spinneret scuta in both sexes; both sexes of *Wanzia* have a sclerotized abdominal tip; males of *Tekellatus*, *Toddiana*, and *Alaranea* have a shiny, nearly transparent scutum covering the very dorsum of the abdomen. Most Cyatholipidae have a sparse, inconspicuous covering of setae on the abdomen. Conspicuous, coarse setae occur in *Matilda*, in *Ilisoa* and *Pokennips*, and in *Cyatholipus* and *Teemenaarus*. In *Cyatholipus*, *Ilisoa* and *Pokennips* the abdominal dorsum is sparsely covered with coarse setae, and in *Teemenaarus* such setae may be found on the posterior apex of the abdomen. In some species the setal bases along the anterodorsal margin of the abdomen are enlarged and resemble picks (Fig. 9C, D), perhaps as part of a carapace/abdomen stridulatory mechanism. Abdominal markings in *Vazaha*, *Buibui*, *Kubwa*, *Pembatatu*, *Ubacisi*, *Uvik*, and some *Ulwembua* are stereotyped and vary little: the abdomen is dark grey, with anterodorsal median and lateral longitudinal yellow-white bands and posterodorsal transverse yellow-white chevrons (Figs. 57C, 139C). These markings are typical. In *Wanzia*, *Isicabu*, *Scharffia* and *Alaranea* abdominal markings vary greatly. Dark pigment may be scant or completely overlay a basic pattern.

Spinning organs. The colulus is a triangular, fleshy lobe (Figs. 8A, 10A). The female spinnerets (Fig. 10A–D) are typical of the Araneoidea in having a single ALS major ampullate gland spigot plus a nubbin and 12–14 piriform gland spigots with highly reduced bases. The PMS of most species have a large, anteromedian cylindrical gland (CY) spigot, 2 aciniform gland (AC) spigots, and posterior minor ampullate gland (mAP) spigot. The PLS of most species have the "araneoid triplet" of one flagelliform gland (FL) and two aggregate gland (AG) spigots, two AC spigots, and a single mesal CY spigot. Like most Synotaxidae (except *Synotaxus*) the basal CY spigot is universally absent in cyatholipid females. *Matilda* is unusual in lacking the mAP and AC spigots from the PMS and PLS. As is typical of male spiders (Fig. 11A–D), male cyatholipids lack the CY spigots on the PMS and PLS. However, males retain the araneoid triplet, a situation found otherwise only in erigonine linyphiids (Hormiga 2000) and the symphytognathoid families (Griswold et al. 1998). The male epiandrous spigots are scattered in groups of two to four anterior of the epigastric furrow (Fig. 8B, C).

Respiratory system. There are two anterior book lungs with smooth covers. The posterior respiratory system of cyatholipids (Figs. 8A, 12B) has generated controversy. Davies (1978) concluded that there is a single posterior spiracle that is broader than the width of the spinnerets. She thought that this spiracle leads to a desmitracheate system with highly branched median tracheae. Forster (1988), on the other hand, suggested that there are two posterior spiracles connected by an external groove. He further suggested that the branched tracheae are homologous to the posterior book lungs and that the immediate ancestor of Cyatholipidae was a four-lunged spider. Crucial to this reasoning is the presence of an apodemal lobe (Fig. 12A; AL in Forster 1988, fig. 20), and what Forster differentiated as atrial tracheae (Fig. 12A, C; AT in Forster 1988, fig. 20) and pulmonary tracheae (PT in Forster 1988, fig. 20). The apodemal lobe was shown by Purcell (1909) to be the homologue of the median tracheae: its presence in Cyatholipidae suggested to Forster that median tracheae are lacking, and that the branched tracheae are direct transformations of the posterior book lungs. Cyatholipidae nest deep within a clade of two-lunged spiders (Griswold et al. 1998; Griswold et al. 1999), suggesting that if the immediate ancestor of cyatholipids had four lungs, the transformation from four to two lungs must have occurred many other times in clades related to Cyatholipidae. While possible, this scenario is at least unparsimonious and it is more parsimonious to interpret the morphology as dimorphic atrial tracheae.

GENITALIA

Male cymbium morphology. The cymbium is expanded retrolaterally by an amount greater than the width of the alveolus (Griswold et al. 1998, fig. 18A). The paracymbium (PC) is cup-shaped. When viewed from the side, the cyatholipid PC appears to be a curved hook tapering to the tip (Fig. 13A; Griswold et al. 1998, fig. 17A, C). When viewed from above, this hook is deeply concave along its distal margin, forming a scoop-shaped structure with mesal and ectal walls (Figs. 5E; 137D; Griswold et al. 1998, fig. 17D). The mesal wall, bordering the tegulum, is the higher of the two, forming an excavation that is essentially apicodorsal (Griswold et al. 1998, fig. 18A, B). The retrolateral margins of cyatholipid cymbia have a unique median process (RMP: Fig. 13A; Griswold et al. 1998, figs. 17A, C, D; 18A, B). This structure is often considered to form part of a "bipartite paracymbium" but, given that the cyatholipid paracymbium described above resembles that of synotaxids and many other araneoids, it is most likely that the retrolateral process on the cymbium represents a novel structure rather than a division of the paracymbium. In most Cyatholipidae the paracymbium is larger than the cymbial RMP. In *Toddiana*, *Tekellatus*, *Matilda* and *Lordhowea* the RMP is larger than the PC, and in *Ilisoa knysna* the RMP is huge. In *Toddiana*, *Tekellatus*, *Lordhowea*, *Matilda* and *Vazaha* the apex of the RMP points distad (Fig. 39D), whereas in the remaining Cyatholipidae the apex points ventrad.

Male palpal bulb morphology. The subtegulum is flattened and cup-shaped with the petiole and anelli indistinct. The tegulum is convex and round to oval. The apical margin of the tegulum of *Teemenaarus* is rounded; in all other Cyatholipidae the tegular apex is modified with processes, lobes or grooves. *Matilda*, *Umwani*, *Tekella*, *Tekelloides*, *Hanea* and most *Ulwembua* have an embolic groove running across the tegular apex (Figs. 45C, 118C); the tegular apices of *Lordhowea*, *Tekellatus*, and *Toddiana* are greatly enlarged and may be complexly modified (Figs. 23C, 39C). In all Cyatholipidae except *Lordhowea*, *Matilda*, *Tekellatus*, *Toddiana*, and *Teemenaarus* the tegulum has a prominent apical lobe (AL). An embolic groove occurs in *Tekella*, *Tekellatus*, *Hanea*, *Umwani*, and in a subset of *Ulwembua* (apical lobe occur in *U. outeniqua* and *U. ranomafana*). The tegula of most Cyatholipidae have a unique median lobe (MLT) through which the reservoir makes a switchback (Figs. 13C, 14C): only *Lordhowea*, *Matilda*, *Tekellatus*, and *Toddiana* lack the MLT. The MLT has a narrow to broad region of denticulate texture. The cyatholipid reservoir is complex (Fig. 14A–F). Typically, the reservoir originates in the subtegulum and spirals in a clockwise direction (left palp, ventral view) around the outer margin of the tegulum from retrolateral through ventral to the apex. The reservoir then extends retroventrad to enter the MLT where it makes an abrupt switchback (this is visible externally through the MLT cuticle), exiting the MLT in an apicad direction. The reservoir switches back to retrolaterad to enter the base of the embolus. Prior to entering the embolus the reservoir, at this point very narrow, makes one or more tight coils (a "curlicue"). The curlicue may describe two (most genera) or three (*Tekelloides*: Fig. 14B) loops. Elaborations on this basic pattern include a second switchback across the middle of the bulb before the curlicue in *Tekella* (Fig. 14E). The reservoirs of *Toddiana* and *Matilda* differ from this pattern. That of *Toddiana* is simple, spiralling around the inside of the tegulum with only a short switchback at the apex before entering the embolic base (Fig. 14F). The *Matilda* reservoir has a median transverse switchback and a retrolateral longitudinal switchback prior to entering the embolic base (Fig. 14D). The tegula of all genera except *Toddiana* have a median tegular apophysis (Fig. 13A). Whereas it has been argued that cyatholipids lack a conductor (e.g., Forster 1988:11) this structure is most parsimoniously interpreted as the homologue of the conductor in other Orbiculariae (Griswold et al. 1998). The conductor (C) may be undivided (Figs. 73A, F; 116B) or bipartite (Figs. 13C; 52A, B): this morphology shows considerable homoplasy. Species with single and bipartite conductors occur in at least *Scharffia*, *Alaranea* and *Ulwembua*. The conductor shape varies greatly. The C of most Cyatholipidae is a semicircular, spoon-shaped structure that is longitudinal with the concavity facing retrolaterally to receive the tip of the embolus. The C of *Tekella* and *Tekelloides* are T-shaped with a narrow base and broad blade (Figs. 46A, 50A). *Tekellatus*, *Matilda*, and *Lordhowea* all have C that comprise a low flange across the middle of the tegulum (Fig. 27C). Denticles occur opposite the embolic tip in *Teemenaarus* (where they are dorsal) and *Cyatholipus* (where they are retrolateral). In the Australian Cyatholipidae *Lordhowea*, *Matilda*, *Tekellatus* and *Toddiana* the embolus is slender without an apparent pars pendula (Fig. 37A), whereas in all other Cyatholipidae a pale pars pendula is associated with the black truncus of the embolus for most of its length, making the embolus appear thick (Fig. 46A). The embolus of most Cyatholipidae does not make a complete turn around the tegulum but especially long emboli that spiral around the tegulum well past the point of origin occur in *Pembatatu*, *Tekelloides*, *Tekella*, *Umwani*, *Hanea*, *Ilisoa*, *Pokennips*, and *Ulwembua*. The embolus of *Tekellatus* describes a sinuous course across the enlarged teguler apex, and in tropical African and Malagasy *Ulwembua* the embolus makes a sinuous curve across the base of the tegulum. In most Cyatholipidae the embolus arises from the tegulum and tapers to the apex but in *Tekellatus* and *Toddiana* there is a recurved lobe near the embolic base (arrow in Figs. 36B, 39C). The probasal projection of the embolic base of *Lordhowea* may be homologous to this lobe. A unique subapical process on the embolus, the parembolic process (PEP), of unknown function, occurs in several genera of Cyatholipidae (Fig. 13B–D). It is subject to apparent homoplasy, and in at least *Scharffia* there are species with and without the PEP. The PEP exhibits a great variety of shapes and textures. The fleshy type of PEP, which includes a variety of forms ranging from the swollen, corrugated PEP of *Isicabu* to the thin, folded, sometimes attenuate flaps of *Cyatholipus*, is widespread. A PEP with an apical hook is a characteristic of *Buibui*; a similar form is found in *Alaranea betsileo*. The arborescent form comprising a tree-like array of long, branched teeth characterizes *Pembatatu*. Several PEP are unique: the anvil-shaped PEP of *Uvik*; the elongate fleshy lobe, (covered with digitate processes) of *Tekella*; and the small, irregular flaps of *Tekelloides*. Sclerotized PEP occur in three genera: *Teemenaarus*, which has a proximal, procurved, sclerotized hook and distal, denticulate, fleshy lobe; in *Pokennips*, which has a large, concave, smooth, sclerotized lobe; and in *Wanzia*, in which the fleshy PEP has a large, sclerotized base. Small pustules occur on the fleshy PEP of *Cyatholipus* and on the PEP of *Ubacisi*, *Buibui*, *Uvik*, *Wanzia*, *Isicabu*, *Scharffia* and *Alaranea*. Teeth or short denticles occur on the base of the PEP of a variety of Cyatholipidae. *Teemenaarus*, *Ubacisi*, and *Kubwa* have the fleshy PEP base covered with teeth, as is the base of the hooked PEP of *Buibui*. The branched structures on the base of the PEP of *Pembatatu* are also teeth. Teeth occur on the embolus near the PEP of *Wanzia*, but are absent from the PEP.

Female epigynum morphology. Cyatholipids are entelegyne spiders with well-developed, sclerotized epigyna (Fig. 15A–C). As is typical of the Entelegynae, the epigynal region is divided longitudinally by a pair of furrows into a median lobe (ML) and two lateral lobes (LL). *Lordhowea* has the simplist epigynum in the Cyatholipidae: the ML is broadened posteriorly but otherwise unmodified. The ML is small and parallel sided in most Cyatholipidae, but in the Australian genera *Matilda* and *Toddiana* the ML is greatly expanded posteriorly. An epigynal scape (S), which is a cuticular projection arising anteriad of the copulatory openings (CO), is present in *Teemenaarus* and all New Zealand and Afrotropical genera (Fig. 142A–C). In all Cyatholipidae that have a scape except *Vazaha*, the S arises at the anterior margin of a depressed atrium (AT) and the copulatory openings lie beneath a transverse median hood (MH) that covers the anterior half of the epigynal atrium (Fig. 142A–C). The median hood is typically of thin cuticle, and may be translucent or even transparent. The hood attaches medially to form a septum. A broad, deep atrium also occurs in *Toddiana*, which lacks a scape. In some taxa (i.e., *Scharffia*, *Wanzia*, *Umwani*, most *Ulwembua*) the atrium forms furrows that extend anteriad of the scape. These anterolateral furrows extend only slightly (*Ulwembua outeniqua*, *Scharffia*) or may approach (*Ilisoa*) or meet (some *Ulwembua*), isolating the scape in the center of the epigynum. *Pokennips* has a long, slender, flexible S fused to the MH (Fig. 103B). The epigyna of *Ilisoa hawaquas* and *I. conjugalis* are unique: the atrial furrows extend narrowly behind the scape to nearly meet anteriorly, and the scape is broadly triangular, blunt-tipped, and raised on a mound above the broad median septum (Fig. 73B, D).

Vulval morphology. All Cyatholipidae have spermathecal heads (HS) that are nearly spherical, thick-walled and heavily sclerotized and have a few pores in the anterior wall (Fig. 16A–F). The fertilization duct (FD) empties the HS posteriorly (Fig. 133A). Vulval morphology is otherwise diverse. The simplest vulval morphology is found in *Lordhowea* and *Vazaha*: the copulatory openings (CO) directly contact the HS (Fig. 133G). In all other genera the CO communicate with the HS via an afferant duct (AD) that usually enters the HS laterally. In *Kubwa* the CO is far laterad of the HS and communicates with the HS via a short, narrow, nearly straight AD (Fig. 91B). In *Wanzia* the short AD curves around the base of the HS (Fig. 16D). An AD that is sclerotized and hemispherical (Fig. 56B–F) characterizes the genera *Alaranea*, *Buibui*, *Cyatholipus*, *Pembatatu*, *Scharffia*, *Ubacisi*, and *Uvik*. The AD opens from the CO posteroventrally, then forms a hemispherical chamber that extends ventrad and laterad of the HS and enters the HS laterally. The morphology is remarkably uniform over this large selection of genera, although the relative size of AD and HS may vary. The AD of *Cyatholipus*, *Ubacisi*, *Buibui*, *Alaranea*, and some *Isicabu* and *Scharffia* are no larger than the HS, whereas AD much larger than the HS occur in *Uvik*, *Isicabu henriki* and *I. margrethae*, in *Pembatatu* and all *Scharffia* except *S. holmi*. The AD of *Pembatatu* are twisted laterad of their entrance to the HS (Figs. 96A, B; 99A). Vulva AD that are hyaline (translucent to transparent) occur in *Tekelloides*, *Tekella*, *Umwani*, *Hanea*, *Ilisoa*, *Pokennips*, and *Ulwembua* (Fig. 16A, C). In this suite of genera the AD extends far anteriad of the HS before returning posteriad to enter the HS laterally. This anteriad-posteriad course otherwise occurs only in *Isicabu henriki* and *I. margrethae*, where the AD are sclerotized. The hyaline AD are diverse. All members of *Ulwembua* have a unique conformation of the hyaline vulval duct: the duct first extends far anteriad of the CO, switches back dorsally and then ventrally of this duct, and then enters the HS laterally (Fig. 16A, C, E). The hyaline duct of *U. pulchra*, *U. denticulata*, *U. usambara*, and the Malagasy *Ulwembua* species has 1–3 lateral twists. All members of *Ilisoa* have a unique conformation of the hyaline vulval duct: the duct first extends anteriad, making one short lateral loop, then straight posteriad to join the HS (Fig. 75A–D). All other hyaline AD are unique: in *Tekella* the AD is a wide ventral cone extending anteriad to a U-shaped cross connection, dorsally forming a wide loop extending posterolaterad to enter the HS laterally (Fig. 43A, C, E); in *Tekelloides* the AD is a wide ventral cone extending anteriad as a tube around the anterior margin of the large, sclerotized HS to enter a 3-lobed lateral duct that enters the HS ventrally (Fig. 43B, D, F); in *Pokennips* the AD extends broadly anteriad to an apicodorsal curved chamber and then extends posteriad as a broad curve to enter the HS laterally (Fig. 99B, D, F); and in *Umwani* the AD extends anteriad as a simple, broad chamber, with a posterolateral side chamber curving around ventrally to enter the HS anterolaterally (Fig. 138B, D, F). The AD of *Matilda*, *Toddiana* and *Teemenaarus* are unique. In *Matilda australia* the vulva is large, entirely sclerotized, with the AD a long cylinder that extends ventrally to the anterior margin of the vulva, with internal ducts forming a lateral spiral of 1 curve that enters the HS laterally (Fig. 30A–C). Other, undescribed *Matilda* have a short, straight AD. In *Toddiana* the AD spirals anteriorly to the HS, and an efferent duct (ED) extends posteriad to the posterior FD (Fig. 30D). In *Teemenaarus* the AD is a sclerotized lateral oval that enters the HS laterally (Fig. 30E).

FOSSIL CYATHOLIPIDS

Three species in two genera attributed to this family have been described from fossils in northern Europe (Wunderlich 1993). *Succinilipus teuberi* Wunderlich and *Spinilipus kerneggeri* Wunderlich are from Baltic amber and *Succinilipus saxoniensis* Wunderlich is from German Bitterfeld amber. The last species may be of Miocene age (approximately 22 Ma) and the former two of Eocene age (approximately 40 Ma) (Krzeminskja and Krzeminski 1992). Wunderlich's figures (Wunderlich 1993) depict palpal paracymbia and a posterior tracheal spiracle consistent with placement in Cyatholipidae. The specimens figured present only a few characters that might be useful for placement within Cyatholipidae. *Spinilipus kerneggeri* appears to have a cymbial RMP directed ventrad (Wunderlich 1993, fig. 6) and an embolus originating near the apex of the bulb (Wunderlich 1993, fig. 4). *Succinilipus teuberi* appears to have a spine beneath male metatarsus I (Wunderlich 1993, fig. 1), a cymbial RMP directed distad (Wunderlich 1993, fig. 15) and the embolic origin near the base of the bulb (Wunderlich 1993, fig. 16). The full range of characters that would be necessary to include the species in the cyatholipid phylogeny cannot be assessed. From the few characters suggested by the illustrations *Succinilipus teuberi* resembles the Australian genera *Tekellatus* and *Toddiana*.

It has not been possible to examine the types of Wunderlich's species, but, through the courtesy of Dr. Wunderlich I have been able to examine specimens in Bitterfeld amber of undescribed species attributed to *Succinilipus*, *Spinilipus* and a new genus near *Spinilipus*. The placement of these specimens in Cyatholipidae is dubious. In one *Succinilipus* specimen the abdominal venter is clearly visible and there is no evidence of the broad posterior spiracle characteristic of Cyatholipidae. In a second *Succinilipus* specimen the abdominal venter is obscured: the palpal cymbium has two retrolateral processes, possibly homologous to the PC and RMP, but the PC does not appear to have the cup-shaped form typical of Cyatholipidae and Synotaxidae. In neither the specimen of *Spinilipus* nor the two of a new genus near *Spinilipus* is there the broad posterior spiracle characteristic of Cyatholipidae.

In sum, the evidence from published descriptions of fossil species is inadequate to place them phylogenetically. Moreover, specimens presumed congeneric with the fossil species may not be Cyatholipidae. Because the phylogenetic data are inadequate and the familial placement of at least some fossil species is dubious, the extinct cyatholipid genera cannot be treated further in this monograph.

PHYLOGENETICS

Phylogenetic placement and Sister group of the Cyatholipidae. Although placement of the Cyatholipidae in the Araneoidea had long been clear, the first quantitative phylogenetic analysis including this family was by Griswold, Coddington, Hormiga, and Scharff (1998). Cyatholipidae share the synapomorphies of several nested clades on their cladogram for Araneoidea (Griswold et al. 1998, fig. 7). These clades were given informal names. With the "derived araneoids" cyatholipids share loss of the PMS aciniform brush (the cyatholipid PMS has only a few AC spigots: Fig. 10C) and the peripheral position of the mesal PLS CY spigot (Fig. 10D); with the "reduced piriform clade" cyatholipids share smooth booklung covers (Fig. 9A, C) and PI spigot bases reduced or absent so that the shaft appears to arise directly from the spinneret (Figs. 10B, 11B); with the "araneoid sheet web weavers" cyatholipids share the modification of the orb web into a sheet (Fig. 2A–C) and absence of the PMS mAP spigot nubbin (Fig. 10C); and with the "spineless femur clade" cyatholipids share loss of spines from leg femora (Fig. 1). Cyatholipidae and Synotaxidae are sister groups. Synapomorphies supporting this hypothesis include a cup-shaped paracymbium (Figs. 5E, 127D), loss of the median apophysis (Fig. 13C), and truncate posterior sternal margin (Fig. 4F–H). Another possible synapomorphy is the loss of the basal CY spigot from the PLS (Fig. 10A, D). All cyatholipids, and all studied synotaxids except *Synotaxus*, lack this spigot. If optimized as a cyatholipid/synotaxid synapomorphy, regain of this spigot is required in *Synotaxus*. An additional potential synapomorphy for synotaxids and cyatholipids is the form of the egg sac, which in Cyatholipidae is spherical, loosely woven, and ornamented with small tubercles (Forster 1988, fig. 5). A similar eggsac is made by *Synotaxus* at La Selva, Costa Rica (CG, pers. obs.).

Synapomorphies of the Cyatholipidae. Griswold, Coddington, Hormiga, and Scharff (1998) suggested a cymbium greatly expanded retrolaterally with a retromedian process (Fig. 13A, C), a broad posterior tracheal spiracle (Fig. 8A) and loss of the claw from the female palp (Fig. 6E) as unambiguous synapomorphies for this family. Loss of the basal CY spigot from the PLS is a possible synapomorphy: if optimized here parallel loss is required within the Synotaxidae (Griswold et al. 1998, fig 9, node 2). An additional synapomorphy suggested by the current study is the cheliceral promargin with four teeth (character 15; Fig. 5B, C). The retention of the "araneoid triplet" of one flagelliform gland and two aggregate gland spigots on the PLS of males (Fig. 11A, D) may be another cyatholipid synapomorphy, presumably resulting from altered ontogeny.

PHYLOGENETIC METHODOLOGY

The data set. A data set (Appendix) was assembled comprising 37 representative cyatholipid species embracing the full range of character variation in the family. Initially, exemplars were assigned codes and only after the completed analysis were they assigned to genera. For simplicity, this post facto assignment of species to genera is represented in the matrix.

Taxa were chosen with the aim to minimize missing data and redundancy. Missing data may lead to additional equally parsimonious cladograms, many resulting from ambiguous or unsupportable optimizations and/or multichotomies (Platnick et al. 1991), and taxa redundant for all character data lead to multichotomies. Characters from both sexes are informative in cyatholipid phylogeny, so exemplars were chosen only when both sexes are known. Exceptions were the two monotypic genera *Tekellatus* and *Hanea* known only from males that had been previously described. To include these genera in the analysis it was necessary to accept missing entries for female data.

If two or more species were identical for all phylogenetically informative characters, only one was included in the data matrix as an exemplar. Although all species are diagnosable from one another, including all these in the matrix would introduce several sets of identical lines of data, without characters to resolve them. These redundant species are added to the summary cladogram at nodes unresolved from their phylogenetically identical relative that was chosen as an exemplar (Fig. 21).

Data for all three *Ilisoa* species are included in the matrix. The exemplar "*Ilisoa* spp." is a composite of the male of *Ilisoa knysna* and the female of *Ilisoa hawequas* and is included to test the monophyly of *Ilisoa*. All *Cyatholipus* are identical for the phylogenetically informative characters considered here. Potentially informative characters do occur within *Cyatholipus*, i.e., the unique encircling ridge on the tegular MLT of *C. tortilis* and *C. isolatus* (Figs. 69B, 70C) and the unique transverse ridge at the anterior margin of the scape found in *C. isolatus* and *C. icubatus* (Fig. 70B), but in no case do demonstrably derived morphologies occur in more than one *Cyatholipus* species known from both sexes. On the summary cladogram (Fig. 21) *C. icubatus*, *C. tortilis* and *C. isolatus* are grouped together.

Below is a list of the exemplar taxa (**in bold**) and those other taxa that are redundant for phylogenetically informative characters.

Alaranea betsileo Griswold, 1997 ♂♀ represents *Alaranea ardua* Griswold, 1997 ♂♀ and *Alaranea merina* Griswold, 1997 ♂♀

Buibui orthoskelos, new species ♂♀ represents *Buibui kankamelos*, new species ♂♀

Cyatholipus quadrimaculatus Simon, 1894 ♂♀ represents *Cyatholipus avus* Griswold, 1987 ♂♀, *Cyatholipus hirsutissimus* Simon, 1894 ♀, *Cyatholipus icubatus* Griswold, 1987 ♀, *Cyatholipus isolatus* Griswold, 1987 ♂♀ and *Cyatholipus tortilis* Griswold, 1987 ♂

Isicabu reavelli Griswold, 1987 ♂♀ represents *Isicabu zuluensis* Griswold, 1987 ♂

Isicabu henriki, new species ♂♀ represents *Isicabu margrethae*, new species ♂♀

Pembatatu gongo, new species ♂♀ represents *Pembatatu mafuta*, new species ♂♀

Scharffia holmi Griswold, 1997 ♂♀ represents *Scharffia rossi* Griswold, 1997 ♂

Ulwembua pulchra Griswold, 1987 ♂♀ represents *Ulwembua denticulata* Griswold, 1987 ♂♀

Ulwembua ranomafana Griswold, 1997 ♂♀ represents *Ulwembua nigra*, new species ♂♀

Umwani artigamos, new species ♂♀ represents *Umwani anymphos*, new species ♂

Rooting of analysis. An outgroup synotaxid ground plan was included in the matrix and the the cladogram was rooted between this and the cyatholipid exemplars: this groundplan was derived from the hypothesis in Griswold et al. (1998) specifying (*Synotaxus* (*Chileotaxus* (*Meringa*, *Pahora*))). A groundplan was included rather than include several additional characters to force resolution within the Synotaxidae. All characters were scored for these taxa and the groundplan state was optimized to the base of that cladogram using MacClade. If an optimization was ambiguous at the synotaxid/cyatholipid node, recourse was made to the theridioid node (Griswold et al. 1998, fig. 7, node 9)

Calculation of phylogeny. Initially characters were assumed to have equal weight and no ordering among multiple states. Analysis with Hennig86 version 1.5 (Farris 1988) using the options **t;bb***; gave 54 cladograms of 159 steps with a consistency index (c.i.) of 0.47 and a retention index (r.i.) of 0.72. Analysis with PAUP 3.1.1 (Swofford 1993) for a heuristic solution sought under the parameters **random taxon addition for 10 replicates, tree-bisection-reconnection branch-swapping performed, and MULPARS in effect** gave 52 cladograms of 159 steps. Analysis was also done with Nona 1.15 (Goloboff 1994), using the options **hold 1000; hold 500; hold /500; amb =;** (which considers ambiguous branch support) and **mult*20**. Each run found 54 cladograms of 159 steps, which were the same as those found by Hennig86. The strict consensus of the 54 cladograms from Hennig86 and Nona, and of the 52 from PAUP is shown in Fig. 17; it is like the fully resolved cladogram in Figs. 18–20 except that it lacks nodes Q, O, N and H. Analysis with NONA using **hold 1000; hold 500; hold /500; amb -;** (which does not consider ambiguous branch support) and **mult*20** gave one 159 step cladogram that was the same as the strict consensus of the 54 cladograms. Pee-Wee 2.15 (Goloboff 1994) obtains trees that maximize implied weights across all characters ("fittest" sensu Goloboff 1993). Analysis with Pee-Wee 2.15 using **hold 1000; hold 500; hold /500; conc = 3; mult*20** gave one 159 step cladogram (Figs. 18–20) with **Fit = 429.2**, which again was the same as the strict consensus of the 54 cladograms. This is considered the minimally restrictive phylogeny for Cyatholipidae: there is no unambiguous support for nodes Q, O, N and H.

This set of 54 trees was subjected to successive weighting by Hennig86 using the commands **xs w;t;bb***. Several iterations produced a stable result of 79 trees, which, on unweighted data, ranged from 162–163 steps (3–4 steps longer than the shortest permitted by the data). The strict consensus of these trees is like the fully resolved cladogram in Figs. 18–20 except that it lacks nodes Z, Y, X, T, Q, M, J, and H, and places *Tekella* and *Tekelloides* as sister to a group containing *Umwani*, *Hanea* and *Ulwembua*. Weights assigned to characters by XS W are shown in the Appendix. Because the trees preferred by successive weighting are both longer than any suggested by unweighted data, and less resolved, the successively weighted trees are rejected.

Branch support indices (Bremer 1994) were calculated with Nona for the cladogram depicted in Figures 18–20. The "Bremer Support" ("Decay Index") for a given node in the shortest unconstrained tree is the number of additional steps required in the shortest trees for which that node collapses. Due to lengthy calculation times the search for branch support was truncated at values of 3, therefore the Bremer support values reported range between 0 and 2 or greater. Bremer support (decay indices) for the nodes in Figures 18–20 are JJ (not calculated), II (>2), HH (2), GG (>2), FF (>2), EE (>2), DD (2), CC (1), BB (1), AA (1), Z (1), Y (1), X (1), W (1), V (1), U (1), T (1), S (1), R (2), Q (0), P (1), O (0), N (0), M (1), L (1), K (1), J (1), I (1), H (0), G (1), F (2), E (1), D (1), C (2), B (2), A (1).

Tree Choice. Is a bolder hypothesis possible? I examined all 54 equally parsimonious cladograms and found that 38 had one or more multichotomy: these were discarded. The remaining twelve cladograms were all fully resolved, and represented the multiples of three areas of ambiguity: 1. two possible arrangements of *Uvik*, *Wanzia* and clade G, 2. two possible arrangements of *Pembatatu embamba*, *P. gongo*, and clade Z, and 3. three possible arrangements of *Umwani*, *Hanea* and clade S. I examined each in turn to determine if one arrangement could be preferred over the others.

Wanzia and *Uvik* could be sister groups, or *Wanzia* and *Uvik* could be successive outgroups to the clade comprising *Isicabu*, *Scharffia* and *Alaranea* (clade G). Support for the former arrangement from Character 41 required that either the anvil shaped PEP of *Uvik* or the sclerotized PEP of *Wanzia* be ancestral to the other: I see no reason to accept either. A second optimization supporting this arrangement is an enlarged hemispherical sclerotized AD

(Character 46). This is artifactual: *Wanzia* is scored as "?" for this character. Therefore, there is no credible evidence supporting the sister group relationship of *Uvik* and *Wanzia*. The alternative arrangement, *Wanzia* as sister group of clade G, is based only on actual evidence of a ♀ petiole (Character 20) and therefore the arrangement (*Uvik* (*Wanzia*, clade G)) is preferred.

Pembatatu embamba and *P. gongo* could be successive outgroups of the clade comprising *Tekella*, *Tekelloides*, *Umwani*, *Hanea*, *Pokennips*, *Ilisoa*, and *Ulwembua* (clade Z), or they could be sister groups. All evidence for the former arrangement is based on hypothetical optimizations for states scored as "?" at clade Z. The latter arrangement is supported by three observable synapomorphies: arborescent PEP (Character 41) and an enlarged hemispherical sclerotized AD (Character 46) with a lateral twist (Character 47). The arrangement ((*Pembatatu embamba*, *P. gongo*) (clade Z)) is preferred.

Hanea and *Umwani* may be sister groups, or each could be successive outgroups of the clade comprising *Pokennips* and *Ilisoa* (clade S). No apparent evidence could be found to support *Umwani* as sister group of clade S. A transverse C (Character 33) could support *Hanea* as sister group of clade S: this requires immediate reversal to longitudinal in *Ilisoa*. Sister group relation between *Umwani* and *Hanea* could be supported by modification of the tegular apex to form an embolic groove (Character 28). Parallel evolution of this morphology is required for *Tekella* plus *Tekelloides*. Neither alternative is satisfactory, and until the female of *Hanea* is discovered its placement must remain enigmatic. I have arbitrarily chosen the resolution ((*Hanea*, *Umwani*) (clade S)).

Choosing the resolutions (*Uvik* (*Wanzia*, clade G)), ((*Pembatatu embamba*, *P. gongo*) (clade Z)), and ((*Hanea*, *Umwani*) (clade S)) from among the alternatives gives a fully resolved cladogram of minimum length as the boldest hypothesis (Figs. 18–20). The discussion of character evolution and classification of Cyatholipidae is based on this cladogram and synapomorphies supporting each node are summarized on the cladogram (Figs. 18–20). Non-exemplar taxa have been added to this cladogram to produce a cladogram for all Afrotropical Cyatholipidae in Figure 21.

Character data. All characters and their states are discussed in turn. Each character is hypothesized to be an independent point of homology, and the states of each character are expressions of that homology. For simplicity character discription and optimization are combined into a single discussion, although description and optimization were not simultaneous: characters were described prior to the phylogenetic analysis and optimized as a result of that analysis. All characters are discussed as if they are singular, e.g., *the* embolus. Character changes are discussed in the present tense as depicted on the cladogram: these changes may also be interpreted to refer to historic events of evolution.

Characters with changes and optimizations for preferred cladogram (Figs. 18–20).

1. Femur I shape: **0**. slender; **1**. thickened and curved. In Synotaxidae and most Cyatholipidae the femora taper gradually to the apex or are slightly thickened at the base (Fig. 1). A femur I that is conspicuously thicker than the other femora and curved or bowed (Figs. 38A, 31A) is derived. This state arises three times in parallel: at node GG as a synapomorphy for *Toddiana* and *Tekellatus*, and as autapomorphies for *Teemenaarus* and *Pokennips*.

2. Patellar shape: **0**. slender; **1**. thickened. In Synotaxidae and most Cyatholipidae the patellae are only slightly wider than the base of the tibia (Figs. 48 C, 71A). A patellar shape in which the maximum diameter of at least patellae I and II is nearly twice that

of the tibial bases (Figs. 26A, 41A, 76) is derived. This state arises three times in parallel: at node HH as a synapomorphy for *Toddiana*, *Tekellatus* and *Matilda*, at node E as a synapomorphy for *Isicabu kombo* and *I. henriki*, and as an autapomorphy for *Hanea*.

3. Male tibia I armature: **0**. unarmed; **1**. with ventral teeth. Uniquely in the Cyatholipidae and Synotaxidae ventral teeth occur on tibia I as a synapomorphy at node GG for *Toddiana* plus *Tekellatus* (Figs. 35, 38A), and as an autapomorphy in *Teemenaarus* (Fig. 31A).

4. Male metatarsus I armature: **0**. unarmed; **1**. with ventral teeth. Uniquely in the Cyatholipidae and Synotaxidae ventral teeth occur on metatarsus I as a synapomorphy at node GG for *Toddiana* plus *Tekellatus* (Figs. 35, 38A), where they are small, and as an autapomorphy in *Pokennips* (Fig. 100A). The enlarged bases of ventral setae found in *Teemenaarus* (Fig. 31A) are apparently not homologous to these teeth.

5. Male metatarsus I shape: **0**. straight; **1**. sinuate, bowed, or twisted. In Synotaxidae and most Cyatholipidae the metatarsi are straight and taper gradually from base to apex (Figs. 1, 26A). Modified metatarsi arise five times: bowed metatarsi are autapomorphies for *Teemenaarus* (Fig. 31A) and *Kubwa* (Fig. 87A), sinuate metatarsi are autapomorphies for *Toddiana* (Fig. 38A) and *Isicabu kombo* (Fig. 7F), and twisted metatarsi are a synapomorphy at node J for *Buibui abyssinica* and *B. cyrtata* (Fig. 7C–E).

6. Male metatarsus I thickness: **0**. slender; **1**. swollen. Uniquely in the Cyatholipidae and Synotaxidae swollen first metatarsi arise on this cladogram as a synapomorphy at node K grouping *Buibui claviger*, *B. cyrtata*, and *B. abyssinica* (Fig. 7C–E), and as autapomorphies for *Kubwa* (Fig. 87A) and *Pembatatu gongo*. This morphology is a synapomorphy uniting *Pembatatu gongo* and *P. mafuta* (the latter species not included in the data matrix; see Figs. 7A, B; 92A).

7. Male carapace profile: **0**. low, indented in profile; **1**. domed, evenly curved. The carapace profile of *Synotaxus* and *Chileotaxus* is low to nearly flat, whereas that of most Cyatholipidae is evenly curved in lateral view (Figs. 1, 31A). Which state is derived on this cladogram is ambiguous: comparison to theridiids and nesticids suggests that a raised profile (which may be evenly curved, or with demarcation between pars cephalica and pars thoracica) is plesiomorphic. A low, indented carapace profile is an unambiguous synapomorphy at node G uniting *Isicabu*, *Scharffia* and *Alaranea* (Figs. 4E, 76A, 104E); it also optimizes as an autapomorphy for Synotaxidae.

8. Carapace length/width: **0**. <1.8; **1**. >1.8. Uniquely in the Synotaxidae and Cyatholipidae *Scharffia chinja*, *S. holmi*, and *S. rossi* have carapaces that are long and narrow (Fig. 104A). This morphology arises at node A as a synapomorphy supporting the monophyly of a group comprising these species.

9. Male carapace shape in dorsal view: **0**. oval; **1**. diamond shaped. The carapaces of Synotaxidae and most Cyatholipidae are oval in dorsal view, having the anterior width less than or equal to that of the posterior (Figs. 26B, 71C). The carapaces of *Isicabu* (Fig. 86B), *Scharffia* (Fig. 104A) and most *Alaranea* (Fig. 51C, D) are narrowed posteriorly, and have the lateral margins angular rather than evely curved, describing a narrow diamond shape when viewed dorsally. This morphology arises at

node G as a synapomorphy uniting *Isicabu*, *Scharffia* and *Alaranea*, with reversal to oval shape in *Alaranea alba*.

10. Carapace posterior margin: **0**. truncate to weakly concave; **1**. deeply concave, flared at sides. Most Synotaxidae and Cyatholipidae have the carapace posterior margin truncate or slightly concave around the insertion of the pedicel (Fig. 31B). *Isicabu* have a carapace posterior margin that is deeply concave and has the sides thickened and produced posterolaterally (Figs. 4B; 77A, B, D). The posterior margin of some male *Alaranea* is similar (e.g., *A. ardua*, Griswold 1997a, fig. 95), but the females of this genus are not so strongly modified as in *Isicabu*. This morphology arises at node F as a synapomorphy for *Isicabu*.

11. Carapace dorsal markings: **0.** unmarked or with reticulations or radii on light background; **1.** with light mark on dark background. Uniquely in the Cyatholipidae and Synotaxidae most *Ulwembua* have a dark carapace with a dorsal light mark, which may be bold or faint, and variously shaped (Fig. 121C). This morphology arises at node X as a synapomorphy for *Ulwembua*, with parallel reversals to an all dark carapace in *U. usambara* (Fig. 130A–C) and *U. antsiranana*.

12. Carapace texture: **0**. smooth; **1**. granulate. The carapaces of most Synotaxidae are smooth, as is the case for the Australian cyatholipid genera *Lordhowea*, *Toddiana*, *Tekellatus* and *Matilda*. Carapace texture that is granulate, denticulate, or rugose (Fig. 4B–E) arises at node FF as a synapomorphy for 19 genera of Cyatholipidae.

13. Tissue surrounding coxae: **0.** soft; **1.** sclerotized. In Synotaxidae and most Cyatholipidae the leg coxae arise from soft, unsclerotized cuticle (Figs. 1, 31A). Sclerotized pleural and sternal extensions may be discernible, and may extend as points between the coxae (Fig. 26A). Fused points that meet to surround the coxae (Figs. 38A, 57A, 76A), often forming broad straps or bands or completely enclosing the coxae, are derived in parallel as an autapomorphy for *Toddiana* and at node M as a synapomorphy uniting *Buibui*, *Uvik*, *Wanzia*, *Isicabu*, *Scharffia*, and *Alaranea*. Reversal to soft cuticle surrounding the coxae occurs in *Isicabu reavelli* (and perhaps as a synapomorphy for this species and *I. zuluensis*, which is not included in the data matrix; see Fig. 86A, C).

14. Sternum length/width: **0**. <1.15; **1**. >1.15. In Synotaxidae and most Cyatholipidae the sternum is shield or heart-shaped and only slightly longer than wide (Figs. 31C, 57B). Elongate sterna (Fig. 104F) arise twice: as synapomorphies at node E uniting the Eastern Arc *Isicabu henriki* and *I. kombo* (occurring at least in males), and at node B uniting the species of *Scharffia*.

15. Cheliceral promargin teeth: **0.** 3; **1.** 4. In most Cyatholipidae the cheliceral promargin has 4 teeth (Fig. 5B, C), whereas in *Matilda*, *Teemenaarus*, *Pokennips* and the Synotaxidae the promargin has 3 teeth. The polarity at the basal synotaxid/cyatholipid node is ambiguous: comparison with the outgroup theridiid/nesticid lineage (Levi and Levi 1972) suggests that three promarginal teeth are plesiomorphic. Four teeth optimizes at node JJ as a synapomorphy for Cyatholipidae; three teeth are derived in parallel as autapomorphies in *Matilda*, *Teemenaarus* and *Pokennips*.

16. Base of male chelicera: **0**. evenly convex; **1**. with protuberance. In Synotaxidae and most Cyatholipidae the chelicerae taper gradually from base to apex (Figs. 1, 31A). Within the Cyatholipidae a large basal protuberance is derived in parallel five times:

as autapomorphies for *Tekelloides* (where it is rastellate dorsally: Fig. 48C), *Vazaha* (Fig. 143), *Ulwembua ranomafana*, and *Pokennips* (Fig. 100A), and as a synapomorphy at node F for *Isicabu* (Figs. 76A, 86A).

17. Male chelicera anterolateral spur: **0**. absent; **1**. present. The anterolateral spur on the chelicerae of *Tekellatus* and *Toddiana* is a unique synapomorphy at node GG uniting these genera (Figs. 35, 38A).

18. Abdomen shape, lateral view: **0**. triangular; **1**. round. In most Synotaxidae the abdomen is triangular or at least elongate; a triangular abdomen, or at least one that is trapezoidal, is true for most Cyatholipidae as well. Round abdomens are derived in parallel six times in the Cyatholipidae: as autapomorphies for *Matilda* (Fig. 26A) and *Lordhowea* (Fig. 22A) (an alternative optimization would be as a synapomorphy at node II, with reversal to trapezoidal at node GG for *Toddiana* plus *Tekellatus*), as autapomorphies for *Cyatholipus* and *Tekella*, and as synapomorphies at node T uniting *Umwani*, *Hanea*, *Pokennips* and *Ilisoa* and at node L uniting the species of *Buibui* (Fig. 59A), with reversal to triangular in *B. abyssinica* (Fig. 57A).

19. Cuticle surrounding male pedicel: **0**. soft; **1**. sclerotized. In at least the basal Synotaxidae *Chileotaxus* and *Synotaxus* and in some Cyatholipidae the cuticle surrounding the male pedicel is soft and unsclerotized. Sclerotized cuticle that forms a ring surrounding the pedicel (Fig. 67A) is derived seven times in the Cyatholipidae: as autapomorphies for *Ilisoa knysna* and *Tekella*, and as synapomorphies at node II uniting *Lordhowea*, *Tekellatus*, *Toddiana*, and *Matilda*, at node DD uniting *Cyatholipus* and *Teemenaarus*, at node V uniting *Ulwembua usambara* and *U. pulchra*, at node I uniting *Uvik*, *Wanzia*, *Isicabu*, *Alaranea*, and *Scharffia*, and as a synapomorphy for *Umwani* (both *U. artigamos* and *U. anymphos*, the latter not included in the data matrix, have the sclerotized state).

20. Female abdomen sclerotized ring surrounding pedicel: **0**. unmodified; **1**. forming a petiole. Among those cyatholipids that have a sclerotized ring surrounding the pedicel, prolongation of this sclerotization into a petiole (Figs. 31B, 147) is derived. This morphology optimizes as autapomorphies for *Matilda* and *Teemenaarus*. I have optimized this as a synapomorphy at node H uniting *Wanzia*, *Isicabu*, *Scharffia* and *Alaranea*, with reversals to the unmodified abdomen required in *Isicabu reavelli* and *I. kombo*. An alternative optimization requires derivation in parallel as autapomorphies for *Wanzia* and *Isicabu henriki* and as a synapomorphy uniting *Alaranea* and *Scharffia*. I prefer the previous optimization, as without it there is no synapomorphy supporting clade H. Furthermore, there is evidence that reversals have occurred in *Isicabu*: the abdomen in *Isicabu kombo* is strongly sclerotized around the pedicel and only slightly different from that in *I. henriki*; *I. reavelli* appears to have lost sclerotization from the typical *Isicabu* condition (it is also not sclerotized around the coxae). The state is unknown in *Tekellatus* and *Hanea*, for which females are undescribed.

21. Petiole texture: **0**. smooth; **1**. annulate. Uniquely in the Cyatholipidae the petioles of *Scharffia* and *Alaranea* are annulate (Fig. 4A, C), representing a synapomorphy at node D uniting these genera.

22. Annulate petiole: **0**. short; **1**. elongate. Uniquely in the Cyatholipidae the petioles of *Scharffia holmi* (and *S. rossi*, which is not included in the data matrix) and *S. chinja* are longer than their diameter, constituing a synapomorphy within *Scharffia* at node A uniting these species (Figs. 4A, 104A–F).

23. Petiole dorsal horn: **0**. absent; **1**. present. Uniquely in the Cyatholipidae the petioles of *Alaranea* have the anterior-most annulus modified dorsally into a small horn or projection (Figs. 4C, 51A), representing a synapomorphy at node C for this genus.

24. Abdominal setae: **0**. fine, short and slender; **1**. coarse, long and stout. Most Synotaxidae and Cyatholipidae have a fine, inconspicuous covering of setae on the abdomen. Conspicuous, coarse setae (Figs. 67A–C, 100A) are derived three times within the Cyatholipidae: as an autapomorphy for *Matilda*, and as synapomorphies at node S uniting *Ilisoa* and *Pokennips* and at node DD uniting *Cyatholipus* and *Teemenaarus*. In *Cyatholipus*, *Ilisoa* and *Pokennips* the abdominal dorsum is sparsely covered with coarse setae, and in *Teemenaarus* such setae may be found on the posterior apex of the abdomen (Fig. 31A). These setae are easily lost: many *Ilisoa* specimens appear to lack such setae, but careful examination reveals enlarged setal bases and usually a few coarse setae remaining.

25. Dorsum of male abdomen texture: **0**. soft; **1**. sclerotized. In most Cyatholipidae and at least the basal Synotaxidae *Chileotaxus* and *Synotaxus* male abdomens lack scuta or extensive sclerotizations. *Matilda* has a dark dorsal scutum in both sexes (Fig. 26A, B), and males of *Tekellatus*, *Toddiana*, and *Alaranea* have a shiny, nearly transparent scutum covering the very dorsum of the abdomen. I have optimized this morphology as synapomorphies at node HH uniting *Matilda*, *Tekellatus*, and *Toddiana* and at node C for *Alaranea*. Even though the scutum morphologies of *Matilda* and of *Tekellatus* and *Toddiana* appear strikingly different it is most parsimonious to consider them homologues. The sclerotized abdominal tip, found in both sexes of *Wanzia* (Fig. 147), is not considered homologous to the dorsal abdominal scutum.

26. Paracymbium (PC) size: **0**. larger than cymbial RMP; **1**. smaller than or equal to RMP. I have coded PC size as relative to the RMP: in most Cyatholipidae the paracymbium is larger than the RMP (Figs. 5E, 13A). In *Toddiana*, *Tekellatus*, *Matilda* and *Lordhowea* the RMP is as large as or larger than the PC (Figs. 37B, 39D), and in *Ilisoa knysna* the RMP is greatly enlarged (Fig. 73E). This character cannot be scored for Synotaxidae, which lack the RMP, so optimization at the base of the cyatholipid cladogram is ambiguous. Synotaxids do have paracymbia similar in size (but not form) to those of *Toddiana*, *Tekellatus*, *Matilda* and *Lordhowea*, so I have chosen to optimize state 1 as primitive and state 0 as a synapomorphy uniting 19 genera at node FF. These taxa have a PC that describes a deep curve in retrolateral view. *Ilisoa knysna* has an RMP much larger than the PC, but this results from hypertrophy of the RMP. *Ilisoa knysna* must be coded as 1, representing an autapomorphy for this species.

27. Retromedian cymbial process (RMP) orientation: **0**. ventrad; **1**. distad. In *Toddiana*, *Tekellatus*, *Lordhowea*, *Matilda* and *Vazaha* the apex of the RMP points distad (Figs. 24B, 40B, 144D), whereas in the remaining Cyatholipidae the apex points clearly ventrad (Fig. 5E). This character cannot be scored for Synotaxidae, which lack the RMP. A ventrad-pointing RMP optimizes unambiguously at node EE as a synapomorphy for 18 cyatholipid genera, with the huge distad-directed RMP of *Ilisoa knysna* constituting an autapomorphic reversal.

28. Tegulum apex: **0**. evenly curved, unmodified; **1**. with an embolic groove; **2**. with an apical lobe; **3**. enlarged. Most Cyatholipidae have modified tegular apical margins, whereas most Synotaxidae and *Teemenaarus* lack these characteristic modifications. *Matilda*, *Umwani*, *Tekella*, *Tekelloides*, *Hanea* and most *Ulwembua* have an embolic

groove running across the tegular apex (Figs. 45C, 118C); the tegular apices of *Lordhowea*, *Tekellatus*, and *Toddiana* are greatly enlarged and may be complexly modified (Figs. 23C, 39C). In most other Cyatholipidae the tegulum has a prominent apical lobe (AL) (Fig. 13B, C). Whereas optimization is ambiguous at the basal node of the cladogram, there is no morphology in the theridiid/nesticid lineage clearly homologous to either states 2 or 3. Therefore I optimize the enlarged tegular apex (state 3) as a synapomorphy at node II uniting *Lordhowea*, *Matilda*, *Tekellatus*, and *Toddiana*; formation of an embolic groove (state 1) on an enlarged but simplified tegular apex is required for *Matilda*. I optimized the apical lobe (state 2), unique in the Synotaxidae and Cyatholipidae, as a synapomorphy at node FF uniting 19 genera of cyatholipids. Reversal to an evenly curved tegular apex (state 0) is required in *Teemenaarus*. Optimization beyond node Z is ambiguous. I consider derivation of an embolic groove (state 1) from an apical lobe (state 2) to have occurred in parallel three times: as synapomorphies at node P uniting *Tekella* and *Tekellatus*, at node Q uniting *Hanea* and *Umwani*, and at node W uniting a subset of *Ulwembua* (with reversal to an apical lobe required for *U. ranomafana*). The apical lobes of *Ilisoa*, *Pokennips* and *Ulwembua outeniqua* are interpreted as retention of plesiomorphic states. Alternatively, the embolic groove could evolve at node Z with three reversals to an apical lobe required in *Ilisoa* plus *Pokennips*, *Ulwembua outeniqua*, and in *U. ranomafana*. This optimization leaves no synapomorphy uniting *Hanea* and *Umwani*, an arrangement preferred for optimization of other characters (see Cladogram Choice).

29. Tegular median lobe (MLT): **0**. absent; **1**. present. Uniquely in the Synotaxidae and Cyatholipidae, the tegula of most Cyatholipidae have a median lobe through which the reservoir makes a switchback (Figs. 13C, 14C). This morphology represents a synapomorphy at node FF uniting 19 cyatholipid genera.

30. Conductor (C): **0**. present; **1**. absent. A tegular apophysis (conductor: Fig. 13A) occurs in all Synotaxidae and all Cyatholipidae except *Toddiana*, where its loss is autapomorphic.

31. Conductor form: **0**. undivided; **1**. bipartite. A second tegular process just basad of the main C occurs widely in the Cyatholipidae. This was once considered as a synapomorphy for *Isicabu* (Griswold 1987c; Griswold et al. 1998: 9), but considerable homoplasy has been discovered in this character. Species with single and bipartite conductors occur in at least *Scharffia*, *Alaranea* and *Ulwembua*. The bipartite conductor (Figs. 13C, 52A, B) arises at node CC as a synapomorphy for 16 cyatholipid genera, with loss of the lower process as autapomorphies in *Scharffia holmi* (and *S. rossi*, which is not included in the matrix) and *Alaranea alba*. Transformation to an undivided process (Figs. 73A, F; 116B) is a synapomorphy at node Y uniting *Hanea*, *Umwani*, *Ilisoa*, *Pokennips* and *Ulwembua*; the bipartite process of *Ulwembua antsiranana* is an autapomorphy.

32. Conductor shape: **0**. semicircular; **1**. T-shaped; **2**. flange; 3. *Teemenaarus* type; **4**. *Hanea* type; **5**. *Pokennips* type. The C of most Cyatholipidae is a semicircular, spoon-shaped structure (state 0; Fig. 122C). Synotaxidae have complex C with many parts: usually at least a portion is semicircular, and therefore Synotaxidae is also assigned state 0. The C of *Tekella* and *Tekelloides* are T-shaped with a narrow base and broad blade (Figs. 46A, 50A): this morphology is a synapomorphy at node P uniting those genera. *Tekellatus*, *Matilda*, and *Lordhowea* all have C that comprise a low flange across the middle of the tegulum (Fig. 27C): this morphology represents

a synapomorphy at node II uniting those genera (and *Toddiana*, which lacks a C). The C of three genera are so unlike that of other Cyatholipidae that no clear suggestion of homology in shape can be made: these are scored as autapomorphic states for *Teemenaarus* (state 3), *Hanea* (state 4), and *Pokennips* (state 5).

33. Conductor orientation: **0**. longitudinal; **1**. transverse. In most Cyatholipidae the C is longitudinal with the concavity facing retrolaterally to receive the tip of the embolus. The different tegulum and complex C in Synotaxidae prevent scoring this character in the outgroup, and optimization at the base of the cyatholipid cladogram is ambiguous. I have optimized the transverse C of *Tekellatus*, *Matilda*, and *Lordhowea* as a synapomorphy at node II: alternatively the longitudinal C could be a synapomorphy at node FF. The transverse C of *Teemenaarus*, *Pokennips*, *Hanea* and *Tekelloides* are autapomorphies in each case.

34. Retrolateral surface of C: **0**. smooth; **1**. denticulate. In most Cyatholipidae and all known Synotaxidae the surface of the C opposite the embolic tip (which is usually retrolateral) is smooth (Fig. 13A). Denticles occur opposite the embolic tip in *Teemenaarus* (on the dorsal side; Fig. 32C) and *Cyatholipus* (on the retrolateral side; Fig. 70C), representing a synapomorphy at node DD uniting these genera.

35. Embolus (E) origin: **0**. basal, near 6 o'clock; **1**. at near 3 o'clock; **2**. between 1–2 o'clock; **3**. at apex of tegulum at or before 12 o'clock. The embolus of *Chileotaxus* and *Synotaxus* (Synotaxidae) and of *Lordhowea*, *Tekellatus*, and *Toddiana* arises basally; in all other Cyatholipidae it arises apically and appears to have evolved a progressively counterclockwise rotation. I have coded the position of E origin as on the face of a clock (left palp, ventral view). Basal origin (state 0) is primitive. The origin rotates to 3 o'clock (state 1) at node FF as a synapomorphy for 19 cyatholipid genera (it is also an autapomorphy for *Matilda*). Further rotation to 1–2 o'clock occurs at node EE for 18 genera, and rotation to an apical origin at or before 12 o'clock occurs at node BB as a synapomorphy for the nine genera *Kubwa*, *Pembatatu*, *Tekelloides*, *Tekella*, *Umwani*, *Hanea*, *Pokennips*, *Ilisoa* and *Ulwembua*.

36. Embolus length: **0**. less than 1.1 rotation; **1**. more than 1.1 rotation. The embolus of Synotaxidae and most Cyatholipidae does not make a complete turn around the tegulum (Fig. 33A). Especially long emboli (Fig. 46A) are derived. The embolus that spirals around the tegulum well past the point of origin is a synapomorphy at node AA uniting *Pembatatu*, *Tekelloides*, *Tekella*, *Umwani*, *Hanea*, *Ilisoa*, *Pokennips*, and *Ulwembua*. The embolus of *Tekellatus* describes a sinuous course across the enlarged teguler apex: if spiralled around the tegulum it would easily exceed 1.1 rotation. This feature is an autapomorphy for *Tekellatus*.

37. Pars pendula: **0**. absent, or associated only with embolic base; **1**. extending for most of embolus length. In Synotaxidae and the Australian Cyatholipidae *Lordhowea*, *Matilda*, *Tekellatus* and *Toddiana* the embolus is slender without an apparent pars pendula (Fig. 37A). In all other Cyatholipidae a pale pars pendula is associated with the black truncus of the embolus for most of its length, making the embolus appear thick (Fig. 46A). This embolus morphology is a synapomorphy at node FF for 19 cyatholipid genera.

38. E curvature across base of tegulum: **0**. even; **1**. sinuate. The unique sinuous embolic curve across the base of the tegulum in tropical African and Malagasy *Ulwembua* (Figs. 116A, B; 118C) is a synapomorphy uniting these species at node W.

39. E base: **0**. simple; **1**. with a recurved lobe. In Synotaxidae and most Cyatholipidae the embolus arises from the tegulum and tapers to the apex (Fig. 45A). In *Tekellatus* and *Toddiana* there is a recurved lobe near the embolic base (Figs. 36B, 39C), which is a synapomorphy at node GG uniting these genera.

40. Parembolic process (PEP): **0**. absent; **1**. present. This unique subapical process on the embolus, of unknown function, occurs in several genera of Cyatholipidae (Fig. 13B–D). It is subject to apparent homoplasy, and in at least *Scharffia* there are species with and without the PEP. On this cladogram the PEP arises at node EE as a synapomorphy uniting 18 genera. Subsequent loss is required for *Scharffia holmi* (and constitutes a synapomorphy uniting *S. holmi* and *S. rossi*, the latter species not included in the matrix) and at node Y as a synapomorphy uniting *Umwani*, *Hanea*, *Ilisoa*, *Pokennips*, and *Ulwembua*. The evolution of the peculiar PEP of *Pokennips* is an autapomorphic parallel development.

41. PEP form: **0**. sclerotized; **1**. fleshy, swollen or folded; **2**. hooked; **3**. anvil-shaped; **4**. arborescent; **5**. *Tekelloides* type; **6**. *Tekella* type. The PEP exhibits a great variety of shapes and textures, some of which differ so greatly from one another as to defy homologizing. Optimization on this cladogram suggests that the primitive type of PEP is the one termed fleshy (state 1), which I consider to emcompass a variety of forms ranging from the swollen, corrugated PEP of *Isicabu* (Fig. 79A, D, I) to the thin, folded, sometimes attenuate flaps of *Cyatholipus* (Fig. 70A). Several derivations occur. A PEP with an apical hook (state 2; Fig. 13D) arises at node L as a synapomorphy for *Buibui*; a similar form arises in parallel as an autapomorphy for *Alaranea betsileo*. The arborescent form (state 4) comprising a tree-like array of long, branched teeth (Fig. 95D), is a synapomorphy at node O uniting the species of *Pembatatu* (including *P. mafuta*, which is not included in the matrix). Several PEP are so distinct that I coded them as autapomorphies: the anvil-shaped PEP (state 3; Fig. 140D) is an autapomorphy for genus *Uvik*; the elongate fleshy lobe, covered with digitate processes (state 6; Fig. 45 D), is an autapomorphy for *Tekella*; and the PEP comprising small, irregular flaps (state 5; Fig. 49D) is an autapomorphy for *Tekelloides*. Sclerotized (state 0) refers to any part of the PEP that is conspicuously shiny black or brown. This state arises as autapomorphies three times: in *Teemenaarus*, which has a proximal, procurved, sclerotized hook and distal, denticulate, fleshy lobe (Fig. 33A); in *Pokennips*, which has a large, concave, smooth, sclerotized lobe (Fig. 102A); and in *Wanzia*, in which the fleshy PEP has a large, sclerotized base (Fig. 149A). There is no homology among the sclerotized forms, and each might be coded as an additional, unique state. I have not coded the PEP of *Pembatatu* and *Tekella* as homologous, though the arborescent PEP of the former might conceivably be transformed into the latter through hypertrophy and elongation of the PEP base. If this were the case, the arborescent form could be considered a synapomorphy at node AA.

42. PEP pustules: **0**. absent; **1**. present. Small pustules occur on some fleshy PEP (Fig. 62D). On this cladogram pustules arise in parallel as an autapomorphy for *Cyatholipus* and as a synapomorphy at node N uniting *Ubacisi*, *Buibui*, *Uvik*, *Wanzia*, *Isicabu*, *Scharffia* and *Alaranea*. The smooth PEP (Fig. 105D) of *Isicabu reavelli* and *Scharffia chinja* are autapomorphic reversals.

43. PEP basal teeth: **0**. absent; **1**. present. Teeth or short denticles occur on the base of the PEP (Fig. 13D) of a variety of Cyatholipidae, and optimize as plesiomorphic for the family. *Teemenaarus*, *Ubacisi*, and *Kubwa* have the fleshy PEP base covered with

teeth, as is the base of the hooked PEP of *Buibui*. I consider the branched structures on the base of the PEP of *Pembatatu* to be teeth (in fact, all but the dentate parts of the PEP of *P. gongo* and *P. embamba* are reduced) but not the much longer digitate structures covering the PEP of *Tekella* or *Isicabu margrethae*. Teeth occur on the the embolus near the PEP of *Wanzia*, but are absent from the PEP. The PEP of *Alaranea betsileo* and *A. alba* have no texture resembling teeth: *A. merina* may have small teeth on the apical hook of the PEP (Griswold 1997a, fig. 72), but these are much smaller than the basal PEP teeth of the taxa here coded as 1. On this cladogram basal PEP teeth are lost three times: as an autapomorphy for *Cyatholipus*, as a synapomorphy at node Z uniting *Tekelloides*, *Tekella*, *Umwani*, *Hanea*, *Ilisoa*, *Pokennips*, and *Ulwembua* (most of which lack PEP, and cannot be scored), and as a synapomorphy at node I uniting *Uvik*, *Wanzia*, *Isicabu*, *Scharffia* and *Alaranea*.

44. Vulval afferent duct (AD): **0**. absent; **1**. sclerotized; **2**. hyaline. In *Synotaxus* and the cyatholipids *Lordhowea* and *Vazaha* each copulatory opening (CO) communicates directly to the spermathecal head (HS) (Fig. 133G). In most Cyatholipidae the CO enter a duct that is as long as or longer than the HS. This afferent duct (AD) may be sclerotized (state 1; Fig. 56B–F) or hyaline (state 2; Fig. 16A, C), and variously shaped. The state is unknown in *Tekellatus* and *Hanea*, for which females remain undiscovered. On this cladogram the sclerotized afferent duct arises twice: at node HH uniting *Matilda*, *Toddiana* (where it spirals) and *Tekellatus*, and at node EE uniting 18 genera. The hyaline form arises from the sclerotized form as a synapomorphy at node Z uniting *Tekelloides*, *Tekella*, *Umwani*, *Hanea*, *Ilisoa*, *Pokennips*, and *Ulwembua*. The unknown female of *Hanea* is predicted to have hyaline ducts.

45. Sclerotized vulval AD form: **0**. tubular; **1**. hemispherical; **2**. *Matilda* form; **3**. *Toddiana* form; **4**. *Teemenaarus* form. The hemispherical sclerotized AD opens to the CO posteroventrally, then forms a hemispherical chamber that extends ventrad and laterad of the HS and enters the HS laterally (Fig. 56B–F). This type (state 1) optimizes as the basic sclerotized AD form. Simplification to a short tube (state 0) arises as autapomorphies for *Wanzia* (Fig. 16D) and *Kubwa* (Fig. 91B). The AD of *Matilda* (state 2), *Toddiana* (state 3) and *Teemenaarus* (state 4) so differ from one another and from other Cyatholipidae that no special homology is postulated: they optimize as autapomorphies for each genus. The state is unknown in *Tekellatus* and *Hanea*, for which females remain undiscovered.

46. Hemispherical vulval AD size: **0**. equal in size to HS; **1**. at least twice as large as HS. The AD of *Cyatholipus*, *Ubacisi*, *Buibui*, *Alaranea*, and some *Isicabu* and *Scharffia* are about as large as the HS (Fig. 56B). Enlarged AD (Figs. 85G; 96A, B; 108A, 138 C) arise four times: as autapomorphies for *Uvik* and *Isicabu henriki* (and uniting this species with *I. margrethae*, which is not in the matrix), as a synapomorphy at node O for *Pembatatu* (including *P. mafuta*, which is not included in the matrix), and as a synapomorphy at node B for *Scharffia*, with reduction of the AD in the peculiar *S. holmi*. The state is unknown in *Tekellatus* and *Hanea*, for which females remain undiscovered.

47. Hemispherical sclerotized vulval AD: **0**. a simple hemisphere; **1**. with a lateral twist. The AD of *Pembatatu gongo*, *P. embamba*, and *P. mafuta* is twisted laterad of its entrance to the HS (Figs. 96A, B; 99A): this is a synapomorphy at node O for *Pembatatu*. This AD complexity may presage the convolutions found in hyaline AD. The state is unknown in *Tekellatus* and *Hanea*, for which females remain undiscovered.

48. Course of vulval AD: **0**. apex at or near the same level as HS (Figs. 56B–D, 64A–D); **1**. extends far anteriad, then switches back to enter HS posterolaterally (Figs. 16C, 138D). State 1 is derived in parallel as a synapomorphy at node Z uniting all Cyatholipidae with hyaline vulval ducts, and as an autapomorphy for *Isicabu henriki* (also in *I. margrethae*, which is not in the matrix).

49. *Ulwembua* hyaline vulval duct: **0**. absent; **1**. present. All members of *Ulwembua* have a unique conformation of the hyaline vulval duct: the duct first extends far anteriad of the CO, switches back dorsally and then ventrally of this duct, and then enters the HS laterally (Fig. 16A, C, E). This morphology is a synapomorphy at node X for *Ulwembua*.

50. *Ilisoa* hyaline vulval duct: **0**. absent; **1**. present. All members of *Ilisoa* have a unique conformation of the hyaline vulval duct: the duct first extends anteriad, making one short lateral loop, then straight posteriad to join the HS (Fig. 75A–D). This morphology is a synapomorphy at node R for *Ilisoa*. It is only with this and the previous character (*Ulwembua* duct) that I can suggest clear homology in hyaline duct conformation. All other hyaline AD are unique and might be scored as autapomorphies: in *Tekella* the AD is ventrally a wide cone extending anteriad to a U-shaped cross connection, dorsally forming a wide loop extending posterolaterad to enter the HS laterally (Fig. 43A, C, E); in *Tekelloides* the AD is ventrally a wide cone extending anteriad as tube around the anterior margin of the large, sclerotized HS to enter a 3-lobed lateral duct that enters the HS ventrally (Fig. 43B, D, F); in *Pokennips* the AD extends broadly anteriad to an apicodorsal curved chamber and then extends posteriad as a broad curve to enter the HS laterally (Fig. 99B, D, F); and in *Umwani* the AD extends anteriad as a simple, broad chamber, with a posterolateral side chamber curving around ventrally to enter the HS anterolaterally (Fig. 138B, D, F). The female of *Hanea* is predicted to have hyaline vulval ducts: when discovered the morphology may clarify the relationship of this enigmatic genus.

51. Hyaline vulval duct with *Ulwembua* lateral twist: **0**. absent; **1**. present. Uniquely among the Cyatholipidae, the hyaline duct of *U. pulchra*, *U. usambara*, *U. denticulata* (not in the matrix), and the Malagasy *Ulwembua* species has 1–3 lateral twists (Figs. 16C, 133B–E). This morphology is a synapomorphy at node W uniting these species.

52. Epigynal scape: **0**. absent; **1**. present. A scape (cuticular projection arising anteriad of the copulatory openings; Fig. 15A–C) occurs in all Cyatholipidae except *Lordhowea*, *Matilda* and *Toddiana*. Such a scape is unknown in the Synotaxidae. Some Synotaxidae have a projecting epigynum (e.g., *Pahora*), but this differs from a scape as the copulatory openings are on the projection. The state is unknown in *Tekellatus* and *Hanea*, for which females remain undiscovered. The scape arises at node FF as a synapomorphy uniting 19 genera.

53. Epigynal median hood (MH): **0**. absent; **1**. present. In all Cyatholipidae that have a scape except *Vazaha*, the copulatory openings lie beneath a transverse median hood that covers the anterior half of the epigynal atrium (Figs. 15A–C, 142A–C). The median hood is typically of thin cuticle, and may be translucent or even transparent. The hood attaches medially to form a septum. This morphology arises at node EE as a synapomorphy uniting 18 genera.

54. Epigynal scape position: **0**. ends far anteriad of MH; **1**. extends to posterior margin of MH. In *Pokennips* the scape arises anteriorly but extends to the MH posterior margin

(Fig. 102C). In *Ilisoa* the scape arises at or near the posterior margin of the median hood ventrad of the median septum (Fig. 73B, D). In all other Cyatholipidae that have scapes, these are far from the MH posterior margin (Fig. 142A). State 1 is a synapomorphy at node S uniting *Ilisoa* and *Pokennips*.

55. Epigynal atrial furrows: **0**. absent; **1**. extending anteriad of scape. In most Cyatholipidae the scape arises at the anterior margin of the epigynal atrium and is widest at its base (Fig. 142A). In some taxa (i.e., *Scharffia*, *Wanzia*, *Umwani*, *Ulwembua outeniqua*) the atrium forms furrows that extend anteriad of the scape. These anterolateral furrows extend only slightly (*Ulwembua outeniqua*, *Scharffia*; Fig. 107C) or may approach (*Ilisoa*) or meet (some *Ulwembua*; Fig. 15A), isolating the scape in the center of the epigynum. On this cladogram atrial furrows arise three times: as an autapomorphy for *Wanzia*, as a synapomorphy at node B for *Scharffia*, and as a synapomorphy at node Y uniting *Umwani*, *Hanea* (for which the epigynum is unknown), *Pokennips*, *Ilisoa*, and *Ulwembua*. Reversals are required for *Pokennips* and at node U for the Malagasy *Ulwembua* to account for the scape positioned at the apex of the atrium.

56. Epigynal median lobe: **0**. small, parallel sided; **1**. large, expanded posteriorly. In most Synotaxidae and Cyatholipidae the median lobe of the epigynum is small, more or less parallel sided, and as wide anteriorly as posteriorly (Figs. 52C, 132C). In *Matilda* (Fig. 28C) and *Toddiana* (Fig. 40C) the median lobe is greatly expanded posteriorly; in *Lordhowea* the ML is conspicuously broader posteriorly (Fig. 24C). The posteriorly expanded ML arises as a synapomorphy at node II uniting *Lordhowea*, *Matilda*, *Toddiana*, and *Tekellatus*, and is predicted to occur in the unknown female of the last genus.

57. Madagascar *Ulwembua* epigynum: **0**. absent; **1**. present. The epigyna of *Ulwembua antsiranana*, *U. ranomafana*, and *U. nigra* (not included in the matrix) are unique: the median hood is much longer than the scape and forms a thick broad median septum (Fig. 129C). This morphology arises as a synapomorphy at node U uniting the Malagasy species.

58. *Ilisoa* epigynum: **0**. absent; **1**. present. The epigyna of *Ilisoa hawaquas* and *I. conjugalis* are unique: the atrial furrows extend narrowly behind the scape to nearly meet anteriorly, and the scape is blunt and raised on a mound above the broad median septum (Fig. 73B, D). This morphology arises at node R as a synapomorphy for *Ilisoa*.

POSSIBLE COEVOLUTION OF CYATHOLIPID GENITALIA

Whereas copulation has never been observed in Cyatholipidae, perhaps some understanding about the interaction of male and female parts can be gained by examining the coincident evolution of features as suggested by the cladogram (Figs. 18–20). For instance, in the ancestor of clade FF there evolved a PC larger than the RMP, a median and apical lobe on the tegulum, an embolus whose origin rotated from basal to lateral and in which the pars pendula was enlarged. The female evolved the epigynal scape and sclerotized, hemispherical AD. Subsequently in the ancestor of clade EE there evolved the PEP, ventrad-directed orientation of the RMP and median hood of the epigynum. Perhaps there was some evolutionarily novel interaction between the large PC, median and apical lobes on the tegulum, an embolus arising laterally with an enlarged pars pendula and the epigynal scape and sclerotized, hemispherical AD and a subsequent evolutionarily novel interaction between the PEP, ventrad-directed orientation of the RMP and median hood of the epigynum.

Taxonomy

Cyatholipidae Simon 1894

Cyatholipeae Simon 1894:711, based on *Cyatholipus hirsutissimus* Simon 1894. Roewer 1942:967.
Cyatholipinae, Wunderlich 1978:33.
Teemenaaridae Davies 1978:42, based on *Teemenaarus silvestris* Davies 1978.
Cyatholipidae, Platnick 1979:116. Brignoli 1983:231. Griswold 1987c:501. Forster 1988:7. Platnick 1989:181. Platnick 1993:172. Wunderlich 1993:234. Platnick 1997:245. Griswold 1997a:54. Griswold 1997b:270. Griswold et al. 1998:8. Griswold 1998a:122.

DIAGNOSIS. — Colulate, entelegyne araneoids that share with the Synotaxidae a cup-shaped paracymbium (Figs. 13A, 5E, 137D) and posteriorly broadly truncate sternum (Fig. 4F–H), and differ in having a retromedian cymbial process (Fig. 13A) and very broad posterior respiratory spiracle (Fig. 8A).

DESCRIPTION. — Total length 1.45–4.40 mm; sexual dimorphism slight, though males have longer legs I and II, and may have these legs modified; there may also be sexual dimorphism in cheliceral shape and abdominal shape and sclerotization; carapace flat to convex, heart-shaped to ovoid, glabrous, smooth to rugose, thoracic fovea reduced to a deep pit or shallow depression, or absent; eight eyes in two rows, anterior row recurved, posterior nearly straight, laterals on low tubercle, contiguous, tapetum canoe-shaped; clypeus vertical; chelicerae smooth laterally with two to three small retromarginal and three to four large promarginal teeth (Fig. 5B, C); labium broader than long (Fig. 5D); sternum scutiform, weakly rugose to strongly pustulate, broadly truncate posteriorly (Fig. 4F–H); legs spineless (Fig. 1) but with dorsal bristles distally on patellae and proximally on tibiae, and in some species distally on tibiae I and II, cuticle squamate, hairs serrate, STC with ventral row of short teeth, ITC short (Fig. 6D), smooth or with a tooth, female palp without claw; tarsal organ at near midpoint of segment, domed, oval to round, with small to minute median aperture (Fig. 6A); two trichobothria dorsally on palpal tibiae, in most species a proximal retrodorsal and row of two dorsomedians on leg tibiae, metatarsi I–III with one proximal dorsal, metatarsus IV lacking trichobothrium, base (Fig. 6B) round and smooth; abdomen sperical, ovoid, to triangular, variously sclerotized, in most species sclerotized from epigastric furrow to pedicel, sclerotizations may surround pedicel and/or spinnerets, and in some species form scuta; abdomen sparsely setose, hairs short to long and coarse, in some species the setal bases along the anterodorsal margin of the abdomen are enlarged and resemble picks, perhaps as part of a carapace/abdomen stridulatory mechanism; book lung covers smooth, posterior spiracle broader than width of spinnerets; spinning organs (Figs. 10, 11) of most species typical of the Araneoidea in having the anterior lateral spinnerets (ALS) with a single major ampullate gland (MAP) spigot plus nubbin and 12–14 piriform gland (PI) spigots with highly reduced bases; posterior median spinnerets (PMS) with large, anteromedian cylindrical gland (CY) spigot, 2 aciniform gland (AC) spigots, and a posterior minor ampullate gland (mAP) spigot; posterior lateral spinnerets (PLS) with the araneoid triplet of one flagelliform gland (FL) and two aggregate gland (AG) spigots, two AC spigots, and a single mesal CY spigot (basal CY spigot universally absent from females); males lack CY spigots but retain the araneoid triplet; colulus a triangular, fleshy lobe (Fig. 8A); male epiandrous spigots scattered in groups of two to four anterior of epigastric furrow (Fig. 8B); cymbium (CB) of male palpal tarsus with basal, cup-shaped paracymbium (PC) and retromedian process (RMP) along the retrolateral margin of the CB just distad of the PC (Fig. 13A); palpal bulb (Fig. 13A–D) with flattened, cup-shaped subtegulum (ST) and round to oval, convex tegulum (T); T of most species with a median conductor (C) that is simple, or consisting of two processes, or a transverse flange; T may have a median lobe (MLT) through which the reservoir makes a switchback; embolus (E) spirals clockwise (left palp, ventral view), narrow or thick with truncus and pars pendula clearly distinguished; may or may not be a parembolic process (PEP) at three-fourths the length of the E (Fig. 13B–D); epigynum (Fig. 15A–C) of most taxa with anterior, projecting scape (S), posteriad of this a depressed atrium (AT) with transverse, median hood (MH) hiding copulatory openings (CO) that are separated by an interior median septum (MS); cuticle laterad of epigynum probably homologous to lateral lobes of other epigyna, these may form narrow, inward-curving processes along epigastric furrow that disappear anteriorly beneath the MH; the area between these processes comprises the epigynal median lobe; vulva (Fig. 16A–F) with posteroventral CO emptying into anteriad-directed afferent duct (AD), AD sclerotized (Fig. 56B–F) or hyaline (Fig. 16A, C), simple or elaborately folded, or absent in a few taxa (Fig. 133G); spermathecal head (HS) of most taxa dorsad of CO and entered laterally by AD, heavily sclerotized, nearly spherical with anterior pores; fertilization duct (FD) posterior.

KEY TO CYATHOLIPIDAE

The key is designed to be both comprehensive and efficient. Whenever possible multiple features are presented as alternatives in each couplet. Nevertheless, within taxa that are variable or with poorly preserved specimens key characters may be lacking or obscured, so for positive determination it is best to compare the figures, descriptions, and distributions of potential taxa.

1 Abdomen soft (Fig. 1), or ♂ only with shiny translucent dorsal scutum (Fig. 51A) 2
- Abdomen with shiny, sclerotized scuta dorsally and ventrally surrounding pedicel and spinnerets (Fig. 26) . . . . *Matilda australia* Forster, 1988 ♂♀
2 (1) Abdomen with anterior petiole greater than 0.10 × length of abdomen (Figs. 51, 104) 3
- Abdomen lacking petiole (Fig. 1), or if present petiole less than 0.05 × length abdomen (Figs. 31A, 147) 13
3 (2) Sternum elongate (Fig. 104B, F), prolonged between coxae IV, with length greater than 1.15 × width; petiole long (Figs. 4A, 104); abdomen of ♂ lacking scutum 4
- Sternum shorter than 1.15 × width (Fig. 4H); petiole with dorsal horn (Figs. 4C, 51A); abdomen of ♂ with a thin, shiny transparent dorsal scutum (Fig. 51A) 7
4 (3) Abdomen with petiole length greater than 0.24 × carapace length (Fig. 104, Griswold 1997b, figs. 1, 18, 20) 5
- Abdomen with petiole length less than 0.17 × carapace length (Griswold 1997b, figs. 41–43) . . . . *Scharffia nyasa* Griswold, 1997 ♂♀
5 (4) Posterior portion of carapace elongate, forming parallel-sided neck, carapace length greater than twice width (Fig. 104A); embolus without parembolic process (Fig. 109C, D); conductor simple; epigynal scape twice as long as wide (Griswold 1997b, fig. 33) 6
- Carapace diamond-shaped in dorsal view (Griswold 1997b, figs. 19, 20), posterior portion tapering, carapace length less than twice width; embolus with parembolic process (Fig. 109A, B); conductor double; epigynal scape much wider than long (Fig. 107C) . . . . *Scharffia chinja* Griswold, 1997 ♂♀
6(5) Length palpal bulb less than 2 × that of the median lobe of the tegulum (MLT), tegulum nearly hidden between MLT and embolus (Figs. 107D, 109D) . . . . *Scharffia rossi* Griswold, 1997 ♂
- Length palpal bulb greater than 2.5 × MLT, tegulum clearly visible between MLT and embolus (Fig. 109C) . . . . *Scharffia holmi* Griswold, 1997 ♂♀
7 (3) ♂♂ 8
- ♀♀ 11
8(7) Conductor simple (Fig. 54A, B; Griswold 1997a, figs. 72, 79, 88) 9

- Conductor bipartite, with thin, broad proximal piece separate from conductor proper (Figs. 52A, B; 54 C) . . . *Alaranea betsileo* Griswold, 1997 ♂

9(8) Proximal point of conductor no longer than distal cup (Figs. 54B, 53C) . . . 10

- Proximal point of conductor elongate attenuate (Fig. 54A) . . . *Alaranea alba* Griswold, 1997 ♂

10(9) Proximal point of conductor small, narrower than cup (Fig. 53C) . *Alaranea merina* Griswold, 1997 ♂

- Proximal point of conductor thick, bifid, equal in width to cup (Fig. 54B) . . . *Alaranea ardua* Griswold, 1997 ♂

11(7) Sternum dark red-brown to black (Griswold 1997a, fig. 97), abdomen of most specimens with extensive dark markings . . . 12

- Sternum pale yellow-brown, abdomen white, marked with lateral, ventral, and posterior black spots (Griswold 1997a, figs 67–69). . . . *Alaranea alba* Griswold, 1997 ♀

12(11) Dorsum of abdomen (Fig. 51C, D; Griswold 1997a, figs. 65, 66, 95, 96) with longitudinal dark bands diverging from apex to middle and converging posteriorly (these bands may be bold, faint, or almost completely obscured by dark markings) . . . *Alaranea merina* Griswold, 1997 ♀ or *Alaranea ardua* Griswold, 1997 ♀

- Dorsum of abdomen (Griswold 1997a, figs. 63, 64) lacking such marks, most specimens with median black band surrounding 1–2 anterior white spots . . . *Alaranea betsileo* Griswold, 1997 ♀

13 (2) Abdomen nearly round when viewed laterally (Figs. 21A, 59) . . . 14

- Abdomen trapezoidal to triangular when viewed laterally, posteriorly overhanging spinnerets (Figs. 1, 57) . . . 40

14 (13) Sclerotizations surround coxae (Fig. 59A, C) . . . 15

- Coxae surrounded by soft cuticle, sclerotized points not meeting (Fig. 21A) . . . 19

15 (14) ♂♂ . . . 16

- ♀♀ . . . *Buibui claviger*, *B. cyrtata*, *B. kankamelos*, or *B. orthoskelos*, all new species (There are no consistent characters to distinguish among the ♀♀ of *Buibui* species with round abdomens.)

16 (15) Metatarsus I modified (Figs. 7C, 59A) . . . 17

- Metatarus I unmodified (Fig. 63) . . . 18

17 (16) Femur I > 2.5 × carapace width . . . *Buibui cyrtata*, new species ♂

- Femur I < 2.5 × carapace width (Fig. 59A) . . . *Buibui claviger*, new species ♂

18 (16) Femur I > 2.5 × carapace width (Fig. 63) . . . *Buibui kankamelos*, new species ♂

- Femur I < 2.5 × carapace width . . . *Buibui orthoskelos*, new species ♂

19 (14) Sclerotization surrounds spinnerets (Fig. 67A, B); epigynum with scape arising at apex of atrium; vulva sclerotized (*Cyatholipus*) . . . 20

- Soft cuticle surrounds spinnerets (Fig. 71B) . . . 28

20 (19) Femur I ≤ carapace length; abdomen white, may have large black spots . . . 21

- Femur I > 1.30 × carapace length; abdomen dark gray with dorsal, transverse light bands (Griswold 1987c, figs 1, 2) . . . *Cyatholipus hirsutissimus* Simon, 1894 ♀

21 (20) ♂♂ . . . 22

- ♀♀ . . . 25

22 (21) Median lobe of tegulum domed, denticulate (Griswold 1987c, figs. 20–22) . . . 23

- Median lobe of tegulum with raised marginal flange (Figs. 69B, 70C; Griswold 1987c, figs. 29–31) . 24

23 (22) Abdomen with one pair of dorsolateral spots (Fig. 67B); PEP slender, convoluted . . . *Cyatholipus avus* Griswold, 1987 ♂

- Abdomen with two pairs of dorsolateral spots (Griswold 1987c, figs. 3, 4); PEP broad, folded . . . *Cyatholipus quadrimaculatus* Simon, 1894 ♂

24 (22) C large, length nearly 0.50 × length of tegulum, strongly produced proximally (Figs. 69A, 70A, C) . . . *Cyatholipus isolatus* Griswold, 1987 ♂

- C length less than 0.45 × length tegulum, weakly produced proximally (Griswold 1987c, figs. 29–31) . . . *Cyatholipus tortilis* Griswold, 1987 ♂

25 (21) Epigynal scape with anterior, transverse ridge (Fig. 70B) . . . 26

- Epigynal scape simple (Fig. 70D) . . . 27

26 (25) Sternum with black spot; abdomen with two pairs of dorsolateral spots; epigynal ridge narrow, height > 0.80 × width (Griswold 1987c, figs. 48–50) . . . *Cyatholipus icubatus* Griswold, 1987 ♀

- Sternum unmarked; abdomen with one pair of dorsolateral spots; epigynal ridge broad, height < 0.55 × width (Fig. 70B) . . . *Cyatholipus isolatus* Griswold, 1987 ♀

27 (25) Epigynum broad, atrium width > 1.50 × length (Griswold 1987c, figs. 42, 43); abdomen with 2 pairs of dorsolateral spots . . . *Cyatholipus quadrimaculatus* Simon, 1894 ♀

- Epigynum narrow, atrium width < 1.40 × length (Fig. 70D; Griswold 1987c, figs. 45, 46); abdomen with 1 pair of dorsolateral spots . . . . *Cyatholipus avus* Griswold, 1987 ♀

28 (19) Embolus arises apically; epigynum with scape 29

- Embolus arising basally (Fig. 24A, B); tegulum apex enlarged with ventral and dorsal pointed lobes (Fig. 23B, C); epigynum lacking scape (Fig. 24C) . . . . *Lordhowea nesiota*, new species ♂♀

29 (28) ♂♂ 30

- ♀♀ 36

30 (29) Embolus with PEP (Fig. 13C, D) 31

- Embolus lacking PEP (Fig. 42) 32

31 (30) PEP sclerotized (Fig. 102A); femur I thickened and curved; metatarsus I with ventral teeth (Fig. 100A) . . . . *Pokennips dentipes* (Simon), 1894 ♂

- PEP fleshy (Fig. 46A); femur I tapering; metatarsus I unmodified (Fig. 44A) . . . . *Tekella absidata* Urquhart, 1894 ♂

32 (30) Conductor longitudinal, cup-shaped; embolus origin apical between 12–1 o'clock, length < 1.3 × rotation 33

- Conductor transverse, T-shaped; embolus origin 10 o'clock, length more than 1.5 × rotation (Fig. 42A, B) . . . . *Hanea paturau* Forster, 1988 ♂

33 (32) Cymbial RMP directed ventrad, no larger than PC (Figs. 5E, 13A) 34

- Cymbial RMP directed distad, much larger than PC (Fig. 73E) . . . . . *Ilisoa knysna* Griswold, 1987 ♂

34 (33) Femur I length less than 1.50 × carapace width (Fig. 134A); abdomen with short, fine setae only (Fig. 134A–F) 35

- Femur I length greater than twice carapace width (Fig. 71A); abdomen with coarse setae (Griswold 1987c, figs. 58, 59, 61) . . . . *Ilisoa conjugalis*, new species

35 (34) Apex of tegulum with deep retroapical groove (Figs. 136C; 137B, C) . . . . *Umwani artigamos*, new species ♂

- Apex of tegulum with shallow marginal groove (Figs. 135B, 136A) *Umwani anymphos*, new species ♂

36 (29) Vulva with hyaline AD complex, convoluted (Figs. 43A, C, E; 75A–D) 37

- Vulva with hyaline AD large, simple (Fig. 138B, D, F) . . . . *Umwani artigamos*, new species ♀

37 (36) Epigynum with atrial furrows extending behind S (Figs. 73B, D; 102C); abdomen with coarse setae (Fig. 100A) 38

- Epigynum with atrial furrows confluent with S (Fig. 46C); abdomen with short, fine setae . . . . *Tekella absidata* Urquhart, 1894 ♀

38 (37) Epigynum with scape broad (Fig. 73B, D) 39

- Epigynum with long, slender, flexible scape fused with MH (Figs. 102C, 103) . . . . *Pokennips dentipes* (Simon, 1894) ♂

39 (38) Lateral abdominal markings broken into a series of spots; epigynum as in Fig. 73B . . . . *Ilisoa hawequas* Griswold, 1987 ♀

- Markings of the abdomen forming lateral bands (Fig. 71A, B); epigynum as in Fig. 73D . . . . *Ilisoa conjugalis*, new species ♀

40 (13) Sclerotizations surround coxae (Figs. 57A, B; 139A, B) 41

- Coxae surrounded by soft cuticle, sclerotized points not meeting (Fig. 31A, C) 50

41 (40) Carapace oval in dorsal view, profile evenly curved (Fig. 57A, C), posterior margin truncate or weakly concave (Figs. 59B, 139C) 42

- Carapace diamond-shaped in dorsal view, profile low, indented, posterior margin deeply concave, swollen, and/or flared laterally (Figs. 4B; 77A, B, D) (*Isicabu*). 48

42 (41) Abdomen lacking petiole, apex not sclerotized 43

- Abdomen with short petiole, apex sclerotized (Fig. 147) . . . . *Wanzia fako* Griswold, 1998 ♂♀

43 (42) ♂♂ 44

- ♀♀ 46

44 (43) Cymbium with RMP directed ventrad; embolus arises apically, PEP present, tegular apex a small simple lobe 45

- Cymbium with RMP directed distad (Fig. 39D); embolus arises basally, PEP absent, tegular apex complexly enlarged (Fig. 40A, B) . . . . *Toddiana daviesae* Forster, 1988 ♂

45 (44) Leg I unmodified (Fig. 139A); tegular apex low (Fig. 141A); PEP small, smooth, hammer-shaped (Fig. 140D) . . . . *Uvik vulgaris*, new species ♂

- Metatarsus I twisted (Figs. 7D, E; 57A); tegular apex raised (Fig. 60A); PEP hooked (Fig. 13D) . . . . *Buibui abyssinica*, new species ♂

46 (43) Epigynum with scape (Figs. 58, 142) 47

- Epigynum lacking scape, with large atrium (Figs. 29D–F, 40C) . . . *Toddiana daviesae* Forster, 1988 ♀

47 (46) Vulval afferent ducts slightly smaller than HS (Fig. 68A, C, E) . . . . *Buibui abyssinica*, new species ♀

- Vulval afferent ducts twice as large as HS (Fig. 138A, C, E) . . . *Uvik vulgaris*, new species ♀

48 (41) Leg femora with dark longitudinal bands; ♂ legs unmodified; vulval afferant ducts twice as large as HS . . . 49

- Legs pale except dark at femur-patella and tibia-metatarsus joints (Fig. 80); ♂ metatarsi I and II sinuate (Fig. 7F); vulval afferant ducts about as large as HS (Fig. 85A, C, E) . . *Isicabu kombo*, new species ♂♀

49 (48) Apex of abdomen without sclerotization (Figs. 76, 77A) . . . *Isicabu henriki*, new species ♂♀

- Apex of abdomen with sclerotization (Figs. 77D, 83) . . . *Isicabu margrethae*, new species ♂♀

50 (40) ♂♂ . . . 51

- ♀♀ . . . 68

51 (50) Embolus with PEP . . . 52

- Embolus lacking PEP . . . 60

52 (51) PEP fleshy or fimbriate, tibia I lacking spurs . . . 53

- PEP proximally sclerotized and falcate (Figs. 32D, 33A), tibia I with ventral spurs (Fig. 31A) . . . *Teemenaarus silvestris* Davies, 1978 ♂

53 (52) Apex of cymbium rounded; PEP small . . . 54

- Apex of cymbium pointed (Fig. 89A, B); PEP very large (Fig. 88D) . *Kubwa singularis*, new species ♂

54 (53) Metatarsus I swollen (Figs. 7A, 92A) . . . 55

- Metatarsus I not swollen (Fig. 1) . . . 56

55 (54) PEP reduced to its strongly toothed arborescent base (Figs. 97D, 98A) . . . *Pembatatu mafuta*, new species ♂

- Blunt PEP retained along with strongly toothed arborescent base (Figs. 93D, 95D) . . . *Pembatatu gongo*, new species ♂

56 (54) Conductor double, longitudinal (Fig. 13C) . . . 57

- Conductor single, transverse, T-shaped (Figs. 49, 50A) . . . *Tekelloides australis* Forster, 1988 ♂

57 (56) Chelicerae with anterior projection (Fig. 86A); tegular apex raised (Fig. 79G, I); carapace diamond-shaped in dorsal view (Fig. 86 B); legs short, femur I < 1.9 × carapace width . . . 58

- Chelicerae convex basally (Fig. 1); tegular apex low (Fig. 98A); carapace oval in dorsal view (Fig. 92B); legs long, femur I > 2.2 × carapace width . . . 59

58 (57) Legs unmarked (Griswold 1987c, fig. 90) . . . *Isicabu zuluensis* Griswold, 1987 ♂

- Femora and patellae with dark lateral bands (Fig. 86A; Griswold 1987c, fig. 87) . . . *Isicabu reavelli* Griswold, 1987 ♂

59 (57) PEP fleshy (Fig. 112A); inner side of the E denticulate distad of PEP (Figs. 111D, 112A) . . . *Ubacisi capensis* (Griswold, 1987) ♂

- PEP small, strongly toothed base arborescent (Fig. 93C, D); E smooth . . . *Pembatatu embamba*, new species ♂

60 (51) Embolus arises apically, tegular apex lobate . . . 61

- Embolus arises basally, tegular apex enlarged (Figs. 36, 37) . . . *Tekellatus lamingtoniensis* Wunderlich, 1978 ♂

61 (60) E length greater than 1 rotation (Figs. 124C, 128A); apex of cymbial RMP directed ventrad, well separated from PC (Fig. 124D); carapace of most species with contrasting light marks (*Ulwembua*) . . . 62

- E length less than 1 rotation (Fig. 144A–C); apex of cymbial RMP directed distad, juxtaposed to PC (Fig. 144D) . . . *Vazaha toamasina* Griswold, 1997 ♂

62 (61) Embolus sinuate across tegulum base (Fig. 128A) . . . 63

- Embolus curving evenly around tegulum (Fig. 124C) . . . *Ulwembua outeniqua* Griswold, 1987 ♂

63 (62) Conductor simple (Fig. 116B) . . . 64

- Conductor double (Fig. 116A) . . . *Ulwembua antsiranana* Griswold, 1997 ♂

64 (63) Conductor smooth on inner surface (Fig. 131D); E weakly sinuate across base of tegulum (Figs. 116B, 127C) . . . 65

- Conductor denticulate on inner surface (Fig. 122C, D); E strongly sinuate across base of tegulum (Fig. 123A) . . . *Ulwembua nigra* new species ♂

65 (64) Conductor subbasal (Fig. 128A), MLT height ≤ C width, chelicerae convex at base (Fig. 117) . . . 66

- Conductor median, MLT height > C width (Fig. 116B), chelicerae with protuberance at base . . . *Ulwembua ranomafana* Griswold, 1997 ♂

66 (65) Conductor relatively broad (Fig. 128A. length < 1.50 × width), PC notch narrow (Fig. 128B), distance between tips of RMP and PC < 1.5 × RMP length . . . 67

- Conductor relatively narrow (Fig. 131D: length > 1.70 × width), the PC notch broad (Fig. 132B), distance between tips of RMP and PC > 2 × RMP length . . . *Ulwembua usambara* new species ♂

67 (66) Abdomen lacking conspicuous subcutaneous guanine deposits (Fig. 126); carapace with dorsal light mark forming a backward pointing triangle (Fig. 120A) . . . *Ulwembua pulchra* Griswold, 1987 ♂

- Abdomen with subcutaneous flecks or meandering streaks of guanine (Fig. 117); carapace (in most specimens) with dorsal light mark forming "Y" (Fig. 120C) . . . . *Ulwembua denticulata* Griswold, 1987 ♂

68 (50) Epignum with median hood (Figs. 15, 55A, D) 69

- Epigynal median hood absent (Figs. 145B, 146) . . . . *Vazaha toamasina* Griswold, 1997 ♀

69 (68) Abdomen covered with fine setae only, if sclerotized around pedicel, not petiolate 70

- Abdomen with some coarse setae, sclerotized around pedicel and weakly petiolate (Fig. 31B, C) . . . . *Teemenaarus silvestris* Davies, 1978 ♀

70 (69) Epigynal scape at apex of atrium (Fig. 55A–C) 71

- Atrium extends anteriad of scape (Fig. 128C) 79

71 (70) Epigynum width < 2.5 × length 72

- Epigynum very wide, width > 3 × length (Figs. 47B, 50C) . . . . *Tekelloides australis* Forster, 1988 ♀

72 (71) Vulval ducts hyaline; carapace of most specimens with dorsal light mark (Fig. 120A, C) 73

- Vulval ducts sclerotized; carapace unmarked 76

73 (72) Carapace all dark or marked with diffuse light and dark markings 74

- Carapace with central, longitudinal light mark on dark background (Fig. 121C) . . . . *Ulwembua outeniqua* Griswold, 1987 ♀

74 (73) Carapace with light and dark markings; AD with paired median pockets partially obscured by the lateral loops (Fig. 133B) 75

- Carapace unmarked, black (Fig. 121A, B); AD with paired median pockets separated from the lateral loops . . . . *Ulwembua nigra*, new species ♀

75 (74) Carapace light except ocular area, margins of pars cephalica, and diffuse radii from thoracic fovea on pars thoracica dark (Griswold 1987c, fig. 38); afferant duct of vulva with five loops (Fig. 133B) . . . . *Ulwembua antsiranana* Griswold, 1997 ♀

- Carapace dark except along lateral margins and on central longitudinal band extending from posterior median eyes posteriorly to behind thoracic fovea (Griswold 1987c, fig. 39); afferant duct of vulva with three loops (Fig. 16C) . . . . *Ulwembua ranomafana* Griswold, 1997 ♀

76 (72) Epigynum as in Figs. 79B, H; 113, atrium normal; afferent ducts ≥ HS 77

- Epigynum as in Figs. 89C, 90, atrium huge; afferent ducts short, narrow, nearly straight. . . . . *Kubwa singularis*, new species ♀

77 (76) Posterior margin of carapace nearly truncate (Figs. 92B, 120C) 78

- Posterior margin of carapace swollen, deeply concave or flared (Fig. 86B) . . . . *Isicabu reavelli* Griswold, 1987 ♀

78 (77) Vulval AD larger than HS, with lateral loop (Fig. 96) . . . .
Pembatatu gongo, *P. mafuta*, or *P. embamba*, all new species ♀ (There are no consistent characters to distinguish among the ♀♀ of *Pembatatu*.)

- Vulval AD = HS, a simple hemisphere (Fig. 114) . . . . *Ubacisi capensis* (Griswold, 1987) ♀

79 (70) Abdomen lacking subcutaneous flecks or meandering streaks of guanine 80

- Abdomen with subcutaneous flecks or meandering streaks of guanine (Fig. 120B, C) . . . . *Ulwembua denticulata* Griswold, 1987 ♀

80 (79) Carapace all dark or mottled; abdomen in dorsal view abruptly narrowed behind middle (Fig. 130) . . . . *Ulwembua usambara* new species ♀

- Carapace with dorsal light mark forming a backward pointing triangle (Fig. 120A); abdomen in dorsal view tapers to tip . . . . *Ulwembua pulchra* Griswold, 1987 ♀

The Australian cyatholipid fauna

Lordhowea, new genus

TYPE SPECIES. — *Lordhowea nesiota*, n. sp., here designated.

ETYMOLOGY. — Named for the type locality; gender feminine.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Details of the palpal bulb and the round abdomen (18:1) are autapomorphic for this monotypic genus; sclerotized cuticle surrounding the male pedicel (19:1), tegulum apex enlarged (28:3), a flange-shaped conductor (32:2) transversly oriented (33:1), and an epigynal median lobe that is large and expanded posteriorly (56:1) are synapomorphies uniting *Lordhowea* with the Australian genera

Matilda, *Toddiana*, and *Tekellatus*. The proximad-projecting angulate lobe near the E base may be homologous to the recurved lobe on the embolic base characteristic of *Tekellatus* and *Toddiana*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Cyatholipus*, *Hanea*, *Ilisoa*, *Matilda*, *Pokennips*, and *Umwani* by having the abdomen nearly round when viewed laterally (Fig. 22), from *Buibui* and *Matilda* in lacking sclerotizations surrounding the coxae, and from *Cyatholipus*, *Hanea*, *Ilisoa*, *Pokennips*, *Umwani* (and all other cyatholipid genera) by having the apex of the tegulum expanded with ventral and dorsal pointed lobes (Figs. 23A–C; 24A, B), the epigynum without S or atrium (Fig. 24C) and the vulva lacking AD to sclerotized HS (Fig. 25).

DESCRIPTION. — See under species description below; leg formula 1243; the distribution of spigots cannot be determined with certainty through light microscope examination of the unique male and female: the apex of the female PLS appears to have three closely spaced, slender spigots, which may comprise the araneoid triplet of one flagelliform and two aggregate gland spigots.

COMPOSITION. — One species.

DISTRIBUTION. — Known only from Lord Howe Island, Australia.

Lordhowea nesiota, new species
Figures 22A–C; 23A–D; 24A–C; 25A, B

TYPES. — Male holotype from Lord Howe Island, New South Wales, Australia, Mt. Gower, elev. 850 m, berlese of rotting wood with fungi and moss, 26 May 1980, S. and J. Peck, deposited in the Queensland Museum courtesy of AMNH. Paratype female, Lord Howe Island, North Hill, elev. 500 ft., in forest litter, 20–25 May 1980, S. and J. Peck, deposited in AMNH.

ETYMOLOGY. — From the Greek *nesos*, island.

DIAGNOSIS. — See generic diagnosis.

MALE (holotype). — Total length 1.66. Carapace shiny red-brown (Fig. 22A), faintly mottled with black reticulations and with black surrounding PME; clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, clypeus shading to yellow-brown laterally, sternum dark red-brown; coxae and trochanters yellow-white, legs yellow-brown, unmarked, pedipalpi yellow-white; abdomen dark grey, with light lateral spot, venter sclerotized brown between posterior spiracle to and surrounding pedicel. Carapace 0.74 long, 0.63 wide, 0.28 high, smooth, evenly curved in profile, oval and widest posteriorly in dorsal view, posterior margin weakly concave, thoracic fovea indistinct; PER and AER 0.36 wide, OAL 0.16; ratio AME:ALE:PME:PLE, 1.20:1.00:1.00:1.00, PME diameter 0.05. Clypeus 0.10 high, chelicerae 0.24 long, promargin with 4 teeth, retromargin with 3. Sternum 0.41 long, 0.42 wide, rugose; labium 0.08 long, 0.16 wide; pedipalpal coxae 0.15 long, 0.11 wide; coxae surrounded by unsclerotized cuticle. Legs unmodified; measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 0.87 + 0.21 + 0.66 + 0.55 + 0.45 = [2.74]; II: 0.77 + 0.21 + 0.62 + 0.53 + 0.49 = [2.62]; III: 0.51 + 0.17 + 0.34 + 0.32 + 0.36 = [1.70]; IV: 0.68 + 0.19 + 0.49 + 0.42 + 0.36 = [2.14]; pedipalpus: 0.18 + 0.07 + 0.07 + (absent) + 0.17 = [0.49]. Abdomen round, sclerotized ventrally between posterior spiracle to and surrounding pedicel, not petiolate, with fine setae only. Palp (Figs. 23A–C; 24A, B) with cymbial RMP short, blunt, directed distad (Fig. 23D), PC broadly triangular in lateral view; tegulum apex enlarged with ventral and dorsal pointed lobes, tegulum with a transverse retromedian flange that probably represents the C, a median pointed process directed proximad, and a retrolateral denticulate lobe; E slender, lacking pars pendula, arising basally near dentate lobe at near 8 o'clock, base with proximad pointing angle; PEP absent.

RATIOS. — Ratios of carapace length/width 1.17, height/width 0.45; ratios of PER/OQP 2.12, PER/OAL 2.27, OQP/OQA 1.23, diameter AME/PME 1.20; ratios of clypeal height/diameter AME 1.67, cheliceral length/clypeal height 2.30; ratio of length femur I/carapace width 1.37.

FEMALE (paratype). — Total length 1.47. Structure as in male except sclerotization not surrounding pedicel, but markings differ (Fig. 22B, C): carapace, chelicerae, labium, pedipalpal coxae, and anterior third of sternum yellow brown, carapace dusky along margins of pars cephalica, with black surrounding AME, PME, and lateral eyes and extending between AME, posterior two-thirds of sternum brown, coxae and trochanters yellow-white, legs yellow-brown, unmarked; abdomen pale grey with anterodorsal dark grey spots, anterolateral dark grey bands extending dorsad medially, and posterodorsal dark grey triangular spots, venter dark grey from around spinnerets to pedicel. Carapace 0.60 long, 0.55 wide, 0.23 high; PER and AER 0.31 wide, OAL 0.12; ratio AME:ALE:PME:PLE, 1.37:1.11:1.00:1.11, PME diameter 0.04. Clypeus 0.08 high, chelicerae 0.27 long. Sternum 0.38 long, 0.40 wide; labium 0.07 long, 0.16 wide; pedipalpal coxae 0.14 long, 0.10 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 0.72 + 0.21 + 0.55 + 0.47 + 0.42 = [2.37]; II: 0.64 + 0.19 + 0.51 + 0.45 + 0.42 = [2.21]; III: 0.47 + 0.17 + 0.34 + 0.25 + 0.32 = [1.55]; IV: 0.62 + 0.19 + 0.45 + 0.36 + 0.28 = [1.90]; pedipalpus: 0.14 + 0.08 + 0.07 + (absent) + 0.19 = [0.48]. Epigynum as in Figure 24C, without S or atrium, ML broad posteriorly; vulva as in Figure 25A, B, lacking AD to sclerotized HS.

RATIOS. — Ratios of carapace length/width 1.10, height/width 0.42; ratios of PER/OQP 2.31, PER/OAL 2.50, OQP/OQA 1.08, diameter AME/PME 1.37; ratios of clypeal height/diameter AME 1.45, cheliceral length/clypeal height 3.25; ratio of length femur I/carapace width 1.31.

NATURAL HISTORY. — Label data indicate that these spiders live in leaf litter and humus.

DISTRIBUTION. — Known only from Lord Howe Island, Australia.

MATERIAL EXAMINED. — Only the types.

Matilda Forster, 1988

Figures 14D; 26A–C; 27A–D; 28A–C; 29A–C; 30A–C

Matilda Forster 1988:33 (type species, by original designation, *M. australia* Forster 1988, from New South Wales, Australia). Platnick 1993:172.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the three cheliceral promargin teeth (15:0), round abdomen (18:1), female abdomen petiolate (20:1), coarse, long and stout abdominal setae (24:1), tegulum apex with an embolic groove (28:1), embolus origin near 3 o'clock (35:1), and a unique vulval form (45:2). The thickened patellae (2:1), sclerotized male abdominal dorsum (25:1), and sclerotized vulval afferent duct (44:1) are synapomorphies uniting *Matilda* with *Toddiana* and *Tekellatus*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera by having the abdomen with three shiny, sclerotized scuta: dorsally, surrounding the pedicel and surrounding the spinnerets (Fig. 26).

DESCRIPTION (based on *M. australia*). — Total length 1.60–1.75. Carapace nearly round in dorsal view, slightly narrowed anteriorly, width equal to length, profile with pars cephalica raised in female, strongly raised in male (Fig. 26A), maximum height 0.50–0.75 times width, smooth, carapace posterior margin weakly concave; thoracic fovea a broad pit near posterior margin of carapace; ocular area with PER width 2.00–2.20 times OAL and OQP, OQP 1.00–1.12 times OQA; diameter AME 1.00–1.28 times PME, distance PME–PLE 0.62–0.86 times PME diameter; clypeus high to very high, height 2.35–2.50 times AME diameter in female, 5.00–5.50 in male, with long, stiff, forward-projecting setae, chelicerae unmodified, short, length 1.00–1.15 times clypeal height in female, 0.36–0.60 in male, 3 teeth on promargin, retromargin unarmed (Forster 1988, fig. 130). Sternum pustulate (Fig. 26C), very broad, length 0.70–0.77 times width, coxae surrounded by unsclerotized cuticle but with pointed sternal and pleural extensions nearly meeting (Fig. 26A). Abdomen round, with three sclerotized scutes: on dorsum, from epigastric furrow to and surrounding pedicel to form petiole, and surrounding spinnerets (Fig. 26A–C); abdominal setae long and coarse, bases of anterior setae enlarged as picks; spinnerets typical except lacking AC spigots from PMS and PLS and mAP spigot from PMS. Leg formula 1423, legs short, femur I 0.88–0.97 times carapace width, unmodified. Male palpus with cymbial RMP pointing distad, long, narrow, and as large as the stout, trapezoidal PC (Figs. 27A, 28B); palpal bulb (Figs. 27A–C; 28A, B) lacking MLT, apex enlarged with embolic groove; C a transverse flange; E slender, pars pendula very thin, length equals one rotation, base smooth, simple, origin at 3 o'clock; PEP absent, reservoir lacking curlicue near embolic base (Fig. 14D). Epigynum (Figs. 28C, 29A–C) lacking S and MH, ML raised longitudinally, much broader posteriorly. Vulva (Fig. 30A–C) large, entirely sclerotized, AD a long cylinder that extends ventrally to anterior margin of vulva, internal ducts of vulva form a lateral spiral of 1 curve that enters HS laterally; FD posterior.

COMPOSITION. — One described species from NSW and Queensland, Australia; at least 3 undescribed species from Victoria.

NATURAL HISTORY. — Label data indicate that these spiders live in leaf litter and humus. The absence of AC and mAP spigots suggests reduced reliance on webs.

DISTRIBUTION. — Eastern Australia.

MATERIAL EXAMINED. — AUSTRALIA: **Queensland**: Mount Lewis, 16°33′S, 145°13′E, elev. 900 m, berlese, rainforest, 8 September 1975, R. W. Taylor (♂♀ QMB), Majors Mt., litter, 14–20 April 1978, V. Davies and R. Raven (7♂6♀ QMB).

Teemenaarus Davies, 1978

Figures 30E; 31A–C; 32A–D; 33A–C; 34A–C

Teemenaarus Davies 1978:294 (type species, by original designation, *T. silvestris* Davies 1978, from Queensland, Australia). Forster 1988:30. Brignoli 1983:231. Platnick 1993:172.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the thickened and curved femur I (1:1), male tibia I with ventral teeth (3:1), sinuate male metatarsus I (5:1), three cheliceral promargin teeth (15:0), petiolate female abdomen (20:1), unmodified tegulum apex (28:0), uniquely-shaped conductor (32:3) transversely oriented (33:1), sclerotized PEP (41:0), and unique vulval AD (45:4). The sclerotized cuticle surrounding male pedicel (19:1), coarse, long and stout abdominal setae (24:1), and denticulate retrolateral surface of the conductor (34:1) are synapomorphies uniting *Teemenaarus* with *Cyatholipus* from South Africa. *Teemenaarus* shares with *Pokennips* a thickened and curved femur I (1:1), 3 teeth on the cheliceral promargin (15:0), a transverse C (33:1), and a PEP (40:1) that is sclerotized (41:0), and it shares with the Australian genera *Toddiana* and *Tekellatus* a thickened and curved femur I (1:1), ventral teeth beneath male tibia I (3:1), and a sinuate male metatarsus I (5:1), but it is most parsimonious to consider *Cyatholipus* the sister group.

Diagnosis. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Tekelloides*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Fig. 31A); males are distinguished from all other cyatholipid genera by having tibia I with ventral spurs (Fig. 31A), the PEP proximally sclerotized and falcate (Fig. 32D), and the C denticulate (Fig. 33A); females are distinguished from all other cyatholipid genera by having the vulval AD a sclerotized lateral oval, entering HS laterally (Fig. 30E).

Description (based on *T. silvestris* paratypes). — Total length 2.70–4.40. Carapace oval in dorsal view (Fig. 31B), length 1.20–1.30 times width, evenly curved in profile (Fig. 31A), maximum height 0.45–0.51 times width; rugose, thoracic fovea a broad triangular depression; carapace posterior margin truncate to weakly concave; ocular area with PER width 1.97–2.20 times OAL, 2.03–2.08 times OQP, OQP 0.96–1.03 times OQA; diameter AME 0.92–1.15 times PME, distance PME–PLE 0.30–0.61 times PME diameter; clypeal height 1.23–1.86 times AME diameter, chelicerae unmodified, length 1.69–2.75 times clypeal height, promargin of fang furrow with 3 teeth, retromargin with 2. Sternum pustulate (Fig. 31C), length 0.72–0.77 times width, coxae surrounded by unsclerotized cuticle (Fig. 31A). Abdomen of female oval (Fig. 31B), male oblong triangular (Fig. 31A), sinuate deposits of guanine visible through cuticle, sclerotized from epigastric furrow to and around pedicel to form petiole, and sclerotized around spinnerets, abdominal setae long, coarse (Fig. 31A), bases of anterior setae enlarged as picks. Spinnerets typical. Leg formula 1243, legs stout, femur I of male 3.14–3.27 times carapace width, female 2.50–2.75, male (Fig. 31A) with femur I bowed, tibia with 2 ventral, distal spurs, metatarsus curved with ventral series of enlarged bases of curved setae, female legs unmodified. Male palpus (Figs. 32A–D; 33A, B) with cymbial RMP pointing ventrad, smaller than the strongly curved PC; palpal bulb with large, smooth MLT, apex low, scaly; C median, transverse, simple, dorsally dentate; E thick with well developed pars pendula, length less than one rotation, base smooth, simple, origin at one o'clock; PEP large, with proximal, procurved, sclerotized hook and distal, denticulate, fleshy lobe, reservoir with double curlicue near embolic base. Epigynum (Figs. 33C, 34A–C) with S and MH that covers most of atrium, atrial furrows confluent with S; ML hidden. Vulva AD a sclerotized lateral oval, entering HS laterally (Fig. 30E); FD posterior.

Composition. — One described species.

Natural History. — At night individuals hang beneath sheet webs built in tree trunks and buttresses in moist forests (Davies 1978, fig. 16; Griswold et al. 1998, fig. 5B), and shelter by day in crevices in adjacent bark.

Distribution. — Queensland, Australia.

Material Examined (*T. silvestris* paratypes). — AUSTRALIA: **Queensland**: Bulburin State Forest, 17–27 March 1975, V. Davies and R. Kohout (5♂3♀ QMB).

Tekellatus Wunderlich, 1978
Figures 35; 36A–D; 37A–B

Tekellatus Wunderlich 1978:38 (type species, by original designation, *T. lamingtoniensis* Wunderlich 1978, from Queensland, Australia). Brignoli 1983:232. Wunderlich 1986:222. Platnick 1989:182. Platnick 1993:172.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the embolus with length more than 1.1 rotation (36:1) and the form of the papal bulb. The thickened and curved femur I (1:1), ventral teeth on male tibia (3:1) and metatarsus (4:1) I, anterolateral spur on male chelicera (17:1), and recurved lobe on the embolic base (39:1) are synapomorphies uniting *Tekellatus* and the Australian *Toddiana*.

DIAGNOSIS. — The male is distinguished from that of all other cyatholipid genera except *Toddiana* by having an anterolateral spur on the chelicera (Fig. 35) and a recurved lobe on the embolic base (Fig. 36B), and is distinguished from that genus by having the coxae surrounded by unsclerotized cuticle (Fig. 35) and by the form of the genitalia with an E that arises basally and the tegular apex smoothly enlarged (Figs. 36A–D; 37A, B); female unknown.

DESCRIPTION (*T. lamingtoniensis*). — Total length 1.78–1.95. Carapace oval in dorsal view, length 1.38–1.48 times width, profile evenly curved (Fig. 35), maximum height 0.36–0.41 times width; nearly smooth with a few wrinkles on posterior margin, carapace posterior margin deeply concave; thoracic fovea broad, shallow, diamond-shaped; ocular area with PER width 2.70–2.93 times OAL, 2.71–2.83 times OQP, OQP 1.04–1.08 times OQA; diameter AME 1.20–1.50 times PME, distance PME–PLE 2.00–2.50 times PME diameter; clypeal height 2.08–2.50 times AME diameter, cheliceral length 2.30–2.62 times clypeal height; chelicerae with short retrobasal and large retromedian spurs, promargin of fang furrow with 4 teeth, retromargin appears to have 2. Sternum pustulate, length 0.91–0.93 times width, coxae surrounded by unsclerotized cuticle. Abdomen trapezoidal (Fig. 35), dorsum with shiny, transparent scutum, sclerotized around spinnerets and from epigastric furrow to and surrounding pedicel, not petiolate; abdominal setae fine, bases of anterior setae dorsad of pedicel enlarged as picks; the distribution of spigots cannot be determined with certainty through light microscope examination of the male: the apex of the PLS appears to have three closely spaced, slender spigots, which may comprise the araneoid triplet of one FL and two AG gland spigots. Legs (Fig. 35) short, femur I length 1.65–1.70 times carapace width, leg formula 1243, femur I enlarged and curved, patella I enlarged, tibia I with three, tibia II with two small mid-ventral spurs, metatarsi I and II with two to three small distal spurs. Male palpus with cymbial RMP pointing distad, larger than PC (Figs. 36A, 37B); palpal bulb (Figs. 36A–D; 37A, B) with apex enlarged into a smooth lobe; tegulum with C a transverse median flange, E thin, lacking pars pendula, length greater than 1 rotation, curled around apical lobe of tegulum, base with lobe, origin basal near 9 o'clock; PEP absent, reservoir with curlicue near embolic base. Female unknown.

COMPOSITION. — One species.

NATURAL HISTORY. — Unknown; the type was collected in low vegetation.

DISTRIBUTION. — Southern Queensland, Australia.

MATERIAL EXAMINED. — AUSTRALIA: **Queensland**: Lamington National Park near Brisbane, August, J. Wunderlich (*T. lamingtoniensis*, holotype ♂, SMF 34607); Lamington National Park, O'Reillys, 4 February 1986, V. Davies (1♂ QMB).

Toddiana Forster, 1988

Figures 6C; 9C, D; 14F; 29D–F; 30D; 38A–C; 39A–D; 40A–C

Toddiana Forster 1988:31 (type species, by original designation, *T. daviesae* Forster 1988, from Queensland, Australia). Platnick 1993:173.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the sinuate male metatarsus I (5:1), sclerotization surrounding the coxae (13:1), loss of the conductor (30:1), and spiralled vulval AD (45:3). The thickened and curved femur I (1:1), ventral teeth on male tibia (3:1) and metatarsus (4:1) I, anterolateral spur on male chelicera (17:1), and recurved lobe on the embolic base (39:1) are synapomorphies uniting *Toddiana* and the Australian *Tekellatus*.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Tekelloides*, *Ubacisi*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Fig. 38A); males are distinguished from all other cyatholipid genera by having E arising basally, lacking PEP, and the tegular apex complexly enlarged, with a ribbon-like process (Figs. 39A–C; 40A, B); females are distinguished from all other cyatholipid genera by having the epigynum lacking the S, with a large atrium (Figs. 29D–F, 40C).

DESCRIPTION (based on *T. daviesae*). — Total length 1.54–2.13. Carapace oval in dorsal view (Fig. 38B), length 1.27–1.41 times width, profile evenly curved (Fig. 38A), maximum height 0.41–0.53 times width; texture nearly smooth, carapace posterior margin truncate to weakly concave; thoracic fovea indistinct; ocular area with PER width 2.33–2.57 times OAL, 2.18–2.40 times OQP, OQP 1.00–1.60 times OQA; diameter AME 1.17–1.60 times PME, distance PME–PLE 1.00–1.60 times PME diameter; clypeal height 1.71–2.00 times AME diameter, cheliceral length 1.53–2.67 times clypeal height; male chelicerae with anterior subapical spur (Fig. 38A), promargin of fang furrow with 4 teeth, retromargin with 3. Sternum rugose, length 0.95–0.97 times width, pleural and sternal extensions meet at least between between coxae II and III. Abdomen of male oblong-triangular, with translucent, shiny dorsal scutum, female triangular, not petiolate, male sclerotized around pedicel, female abdomen soft; abdominal setae fine except some males may have a few coarse setae posteriorly, bases of some anterior setae form stout picks (Fig. 9C, D); spinnerets typical. Legs usually short, femur I 1.60–1.80 times carapace width, leg formula 1243, male femur I stout, curved, patella large, tibia and metatarsus with ventral setal bases enlarged as small spurs, metatarsus sinuate (Fig. 38A). Male palpus with cymbial RMP pointing distad, larger than the PC (Fig. 39D); palpal bulb with tegulum raised medially to form smooth, proximally recurved lobe (Fig. 39C), apex elaborately modified (Fig. 39C) with apical, fluted, scoop-shaped process, posteroapical sclerotized conical projection, and sclerotized, ribbon-like process that spirals dorsad of apex; C absent; E slender with thin pars pendula, base with procurved lobe, origin basal at six o'clock, length 2/3 of one rotation; PEP absent, reservoir (Fig. 14F) sinuate but lacking curlicue near embolic base. Epigynum (Figs. 29D–F, 40C) lacking S and MH, with large, central atrium, ML greatly widened posteriorly. Vulva AD spirals anteriorly to HS, duct extends posteriad to posterior FD (Fig. 30D).

COMPOSITION. — One described species; others undescribed.

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Queensland, Australia.

MATERIAL EXAMINED. — AUSTRALIA: **Queensland**: Bulburin S. F., 25–28 March 1977, R. Raven and V. E. Davies (1♂6♀ QMB).

The New Zealand Cyatholipid Fauna

Hanea Forster, 1988

Figures 41A–C; 42A, B

Hanea Forster 1988:26 (type species, by original designation, *H. paturau* Forster, 1988, from Nelson, New Zealand). Platnick 1993:172.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the thickened patellae (2:1), and a uniquely-shaped conductor (32:4) transversely oriented (33:1). The embolic groove on the tegulum apex (28:1) is a potential synapomorphy uniting *Hanea* with the African *Umwani*, though it is equally parsimonious to consider *Hanea* as the sister group of of the South African *Ilisoa* plus *Pokennips*, supported by the transverse conductor orientation (33:1). *Hanea* does not appear closely related to the other New Zealand genera, though it shares with *Tekella* the derived round abdomen (18:1) and with *Tekelloides* the derived transverse conductor orientation (33:1). Certain placement of *Hanea* will be possible only after discovery of the female.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Cyatholipus*, *Ilisoa*, *Lordhowea*, *Matilda*, *Pokennips*, *Tekella*, and *Umwani* by having the abdomen round (Fig. 41A–C), and distinguished from *Buibui*, *Cyatholipus*, *Pokennips*, and *Tekella* by lacking the PEP, and from the others by having E origin at 10 o'clock, length more than 1.5 × rotation (Fig. 42A, B); female unknown.

DESCRIPTION (holotype of *H. paturau*). — Total length 1.80. Carapace oval in dorsal view (Fig. 41C), narrowed anteriorly, length 1.18 times width, profile evenly curved (Fig. 41A), maximum height 0.47 width; granulate on pars cephalica to weakly rugose laterally, carapace posterior margin truncate; thoracic fovea very shallow, triangular; ocular area with PER width 2.50 times OAL, 2.81 times OQP, OQP 1.07 times OQA; diameter AME 0.86 times PME, distance PME–PLE 1.28 times PME diameter; clypeal height 3.00 times AME diameter, cheliceral length 2.67 times clypeal height; chelicerae swollen basally in lateral view (Fig. 41A), promargin of fang furrow with 4 teeth, retromargin with 3. Sternum pustulate (Fig. 41B), broad, length 0.87 times width, coxae not surrounded by sclerotized cuticle. Abdomen round, unsclerotized, not petiolate; abdominal setae short, fine, bases of anterior setae not enlarged. Leg formula 1243, legs short, femur I 1.08 times carapace width, femora and patellae thick. Male palpus (Fig. 42A, B) with cymbial RMP pointing ventrad, smaller than the PC; palpal bulb with MLT lacking denticulate patch, apex grooved for E; C median, transverse, simple; E thick with pars pendula, length more than 1.5 × rotation, base simple, smooth, origin at 10 o'clock; PEP lacking. Female unknown.

COMPOSITION. — One species.

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Known only from the type locality on the northern end of South Island, New Zealand.

MATERIAL EXAMINED. — NEW ZEALAND: South Island: **Nelson**: Paturau, from litter, 18 August 1964, E. S. Gourlay (holotype ♂, 1 juv. NZAC).

Tekella Urquhart, 1894

Figures 14E; 43A, C, E; 44A–C; 45A–D; 46A–C; 47A

Tekella Urquhart 1894:211 (type species, by original designation, *T. absidata* Urquhart 1894:211; from Urquhart collection, without locality data other than New Zealand). Bryant 1933:19. Davies 1978:301. Wunderlich 1978:39. Brignoli 1983:232. Forster 1988:18. Platnick 1989:182; 1993:172.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the round abdomen (18:1), sclerotized cuticle surrounding male pedicel (19:1), and the PEP that is an elongate fleshy lobe, covered with digitate processes (41:6). The embolic groove on the tegulum apex (28:1) and T-shaped conductor (32:1) are synapomorphies uniting *Tekella* with the New Zealand genus *Tekelloides*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Cyatholipus*, *Hanea*, *Ilisoa*, *Lordhowea*, *Matilda*, *Pokennips*, and *Umwani* by having the abdomen nearly round (Fig. 44A) when viewed laterally, from *Buibui* and *Matilda* by having the coxae surrounded by soft cuticle (Fig. 44A, B), and from *Cyatholipus*, *Ilisoa* and *Pokennips* by lacking coarse setae on the abdomen (Fig. 44A, C). Males are distinguished from *Hanea*, *Lordhowea* and *Umwani* by having a PEP (Fig. 45D); females are distinguished from *Lordhowea* and *Umwani* by having convoluted hyaline vulval AD (Fig. 43A, C, E).

DESCRIPTION (based on *T. absidata*). — Total length 1.90–2.40. Carapace oval in dorsal view (Fig. 44C), narrowed anteriorly, length 1.18–1.27 times width, profile evenly curved (Fig. 44A), maximum height 0.47–0.57 times width, weakly rugose, carapace posterior margin truncate; thoracic fovea a shallow oval; ocular area with PER width 2.21–2.75 times OAL, 2.20–2.50 times OQP, OQP 1.05–1.12 times OQA; diameter AME 0.87–1.14 times PME, distance PME–PLE 0.87–1.28 times PME diameter; clypeal height 1.50–2.00 times AME diameter, cheliceral length 2.57–3.83 times clypeal height; promargin of fang furrow with 4 teeth, retromargin with 3. Sternum broad (Fig. 44B), length 0.87–0.89 times width, texture pustulate, coxae not surrounded by sclerotized cuticle. Abdomen round (Fig. 44A–C), sclerotized around pedicel, not petiolate; abdominal setae short, fine, bases of anterior setae not enlarged; spinnerets typical (Griswold et al. 1998, figs. 46, 47). Legs long, femur I 2.50–3.27 times carapace width, unmodified, leg formula 1243. Male palpus with cymbial RMP pointing ventrad, smaller than PC (Fig. 46B); palpal bulb (Figs. 45A–D; 46A, B) with MLT with apical denticulate patch, apex with groove for E; C median, T-shaped, orientation between longitudinal and transverse, bipartite (simple in some species); E broad with thick pars pendula, length greater than 1.1 rotation, base smooth, origin at 11 o'clock; PEP fleshy, covered with digitate processes (Fig. 45D), E also with subapical process, reservoir with 4 switchbacks between MLT and embolic base (Fig. 14E). Epigynum (Figs. 46C, 47A) with broad S and MH, broad septum between CO, atrial furrows confluent with S; ML trapezoidal, slightly wider posteriorly. Vulval AD hyaline (Fig. 43A, C, E), much larger than HS, ventrally a wide cone extending anteriad to a U-shaped cross connection, dorsally a wide loop extending posterolaterad to enter sclerotized HS laterally; FD posterior.

COMPOSITION. — Five species.

NATURAL HISTORY. — *Tekella* hang beneath sheet webs in moist forests.

DISTRIBUTION. — New Zealand.

MATERIAL EXAMINED. — NEW ZEALAND: South Island: **Canterbury**: Peel Forest, near Geraldine, May 1987, R. Forster (♂♀ CASC).

Tekelloides Forster, 1988

Figures 9A, B; 14B; 43B, D, E; 47B–D; 48A–C; 49A–D; 50A–C

Tekelloides Forster 1988:26 (type species, by original designation, *T. australis* Forster 1988, from Whare Flat, Otago, New Zealand). Platnick 1993:173.
Ariamnes flavonotatus Urquhart 1889:136.
Rhomphaea flavonotatus, Parrot 1946:70.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the protuberance at the base of male chelicera (16:1), transversely oriented conductor (33:1), and PEP formed of small, irregular flaps (41:5). The embolic groove on the tegulum apex (28:1) and T-shaped conductor (32:1) are synapomorphies uniting *Tekelloides* with the New Zealand genus *Tekella*.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Fig. 48C), and from *Alaranea*, *Buibui*, some *Isicabu*, *Scharffia*, *Toddiana*, *Uvik* and *Wanzia* by having the coxae surrounded by soft cuticle (Fig. 48A, C). Males are distinguished from *Tekellatus*, *Ulwembua*, and *Vazaha* by having a PEP (Fig. 49D), and from *Isicabu*, *Kubwa*, *Pembatatu*, *Teemenaarus*, and *Ubacisi* by having the C T-shaped (Fig. 50A) and a unique form of the PEP. Females are distinguished from *Isicabu*, *Kubwa*, *Pembatatu*, *Teemenaarus*, *Toddiana*, *Ubacisi*, and *Vazaha* by having the AD hyaline and convoluted (Fig. 43B, D, F), and from *Ulwembua* by having the epigynum very wide, width >3 × length (Figs. 47B, 50C).

DESCRIPTION (based on *T. australis*). — Total length 2.40–3.00. Carapace oval in dorsal view (Fig. 48B), narrowed anteriorly, length 1.23–1.32 times width, profile evenly curved (Fig. 48C), maximum height 0.45–0.51 times width; finely granulate, posterior margin truncate, thoracic fovea an inconspicuous shallow oval; ocular area with PER width 2.22–2.43 times OAL, 2.35–2.89 times OQP, OQP 1.06–1.13 times OQA; diameter AME 1.00–1.17 times PME, distance PME–PLE 1.33–1.71 times PME diameter; clypeal height 1.86–2.50 times AME diameter, cheliceral length 2.40–3.00 times clypeal height; male chelicerae with large basal projection (Fig. 48C), female convex, lacking projection, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum weakly pustulate (Fig. 48A), length 0.96–1.14 times width, coxae not surrounded by sclerotized cuticle. Abdomen triangular, unsclerotized, not petiolate; abdominal setae fine, bases of anterior setae unmodified (Fig. 9A, B); spinnerets typical. Leg formula 1243, legs long (Fig. 48C), femur I 2.00–2.50 times carapace width, unmodified. Male palpus (Figs. 49A–D; 50A, B) with short, acute cymbial RMP pointing ventrad, smaller than PC; palpal bulb with MLT lacking denticulate patch, apex with groove for E; C median, transverse, bipartite with proximal process beneath T-shaped head (Figs. 49C, 50A); E thick with pars pendula, length greater than 1.3 times rotation, base simple, smooth, origin at 10 o'clock; PEP small, with irregular flaps (Fig. 49D), reservoir with triple curlicue near embolic base (Fig. 14B). Epigynum (Figs. 47B–D, 50C) with narrow S and MH, septum between CO broad, atrial furrows confluent with S; ML trapezoidal, slightly wider posteriorly. Vulva AD hyaline (Fig. 43B, D, F), ventrally a wide cone extending anteriad as tube around anterior margin of large, sclerotized HS to enter 3-lobed lateral duct which enters HS ventrally; FD posterior.

COMPOSITION. — Two species.

NATURAL HISTORY. — *Tekelloides* hang beneath sheet webs in moist forest.

DISTRIBUTION. — New Zealand.

MATERIAL EXAMINED. — NEW ZEALAND: South Island: **Canterbury**: Peel Forest, near Geraldine, 30 May 1987, R. Forster (2♂2♀ CASC).

The Afrotropical Cyatholipid Fauna

Alaranea Griswold, 1997

Alaranea Griswold 1997a:67 (type species, by original designation, *A. merina* Griswold 1997, from central Madagascar).

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Synapomorphies are the petiole dorsal horn (23:1) and sclerotized dorsum of male abdomen (25:1); the annulate petiole (21:1) is a synapomorphy uniting *Alaranea* with the east African genus *Scharffia*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Scharffia* by having the anterior portion of abdomen of both sexes forming a sclerotized, annulate petiole (Fig. 51B–D), and from *Scharffia* by having the petiole produced dorsally into a short projection or horn (Figs. 4C, 51A) and the abdomen of males with a thin, shiny, transparent dorsal scutum.

DESCRIPTION. — Total length 1.60–3.00. Carapace of most species narrowly trapezoidal in dorsal view (Fig. 51C, D), oval in *A. alba*, length 1.39–1.67 times width, low, maximum height 0.38–0.52 width, profile nearly flat (Fig. 51A); texture finely rugose (Fig. 4E), thoracic fovea a small, round pit, carapace posterior margin weakly concave medially (Fig. 51C, D), forming weakly upturned lip (Fig. 4C, E); ocular area with PER width 1.83–2.56 times OAL, 2.14–2.69 times OQP, OQP 0.81–1.11 times OQA; diameter AME 1.00–1.60 times PME, distance PME–PLE 0.80–1.50 times PME diameter; clypeal height 1.11–2.40 times AME diameter, cheliceral length 1.93–3.80 times clypeal height (Griswold 1997a, fig. 51); chelicerae unmodified, promargin with 4 teeth, retromargin with 3. Sternum rugose (Fig. 4H) to pustulate, length 0.88–1.15 times width, plural and sternal sclerotizations extend between and surround coxae (Figs. 4E, 51A). Abdomen sclerotized from epigastric furrow to and surrounding pedicel, sclerotization forming annulate petiole produced dorsally into a short projection or horn (Fig. 4C), anterior sclerotization much broader in males (Fig. 51A), and males with a thin, shiny, transparent dorsal scutum, abdomen otherwise unsclerotized, oval to triangular; abdominal setae short, slender, bases of anterior setae unmodified; spinnerets typical (Griswold 1997a, figs. 9–14). Legs short (Fig. 51A), femur I length 1.63–2.11 times carapace width, unmodified; leg formula 1243. Male palpus with cymbial RMP pointing ventrad (Fig. 53A), smaller than the PC; palpal bulb (Figs. 52A, B; 53A–D) with dentate MLT, apex a small, smooth to pustulate lobe; C median, longitudinal, simple or with accessory process, smooth or rarely dentate; E thick, making simple curve, origin apical at between 10–11 o'clock, ridged; PEP (Fig. 53D) present, fleshy, pustulate, with or without teeth, thick or hooked apically; reservoir with tight double twist (curlicue) near embolic base. Epigynum (Figs. 52C, 55A–F) with S and long MH with slender MS between CO, ML parallel-sided. Vulva (Fig. 56A–F) with sclerotized, simple hemispherical lateral AD, in most specimens larger than HS, FD posterior.

COMPOSITION. — Four species.

NATURAL HISTORY. — See under each species.

DISTRIBUTION. — Madagascar (Fig. 155).

Alaranea alba Griswold, 1997

Figures 54A, 55A, 56B, 155

A. alba Griswold 1997a:76 (♂ holotype from Beria, Madagascar, in MRAC, examined).

DIAGNOSIS. — Distinguished from other *Alaranea* by having the conductor undivided, with the proximal point elongate attenuate (Fig. 54A; Griswold 1997a, figs. 58, 79, 80); sternum pale yellow-brown, abdomen white marked only with lateral, ventral, and posterior black spots (Griswold 1997a, figs. 67–69).

DESCRIPTION. — See Griswold (1997a:76–78) for complete description.

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Known only from the type locality in west-central Madagascar (Fig. 155).

MATERIAL EXAMINED. — MADAGASCAR: **Toliara:** Beria, 19°40′S, 45°23′E, June 1969, A. Lambillon, (♂ holotype and 2♀ paratypes, MRAC, ♂ and ♀ paratypes, CASC).

Alaranea ardua Griswold, 1997

Figures 51A–C; 54B; 55C; 56A, C, E; 155

A. ardua Griswold 1997a:78 (♂ holotype from Marojejy Reserve, Madagascar, CASC type #17332, examined).

DIAGNOSIS. — Distinguished from other *Alaranea* by having the conductor simple, with the proximal point thick, bifid, equal in width to cup (Fig. 54B; Griswold 1997a, figs. 86–88); dorsum of abdomen with sinuate longitudinal dark bands diverging from apex to middle and converging posteriorly (Fig. 51C; Griswold 1997a, figs. 95, 96). There seem to be no consistent characters to separate females of *Alaranea ardua* from *A. merina*, though the carapace of *A. ardua* (Griswold 1997a, fig. 96) tends to be darker than that of *A. merina* (Griswold 1997a, fig. 66).

DESCRIPTION. — See Griswold 1997a:78–81.

NATURAL HISTORY. — *Alaranea ardua* are common inside forest hanging beneath sheet webs between 0.2 and 2 m above ground.

DISTRIBUTION. — Known only from the type locality in northern Madagascar (Fig. 155).

MATERIAL EXAMINED. — MADAGASCAR: **Antsiranana:** Marojejy Reserve, 8.4 km NNW Manantenina, montane rain forest, 14°26′S, 49°45′E, elev. 700 m, 10–16 November 1993, J. Coddington, N. Scharff, S. Larcher, C. Griswold, and R. Andriamasamanana (♂ holotype and ♀ paratype CASC) (13♂11♀ CASC, ZMUC, USNM).

Alaranea betsileo Griswold, 1997
Figures 4C, E, H; 52A–C; 54C; 55E; 56D; 155

Alaranea betsileo Griswold 1997a:68 (♂ holotype from Parc National Ranomafana, Madagascar, CASC type #17333, examined).

DIAGNOSIS. — Distinguished from other *Alaranea* by having the conductor bipartite, with a thin, broad proximal piece separate from C proper (Fig. 52A, B; 54C; Griswold 1997a, figs. 53, 61); in both sexes sternum dark red-brown to black, abdomen of most specimens with extensive dark markings, dorsum lacking sinuate longitudinal dark bands, with median black band surrounding 1–2 anterior white spots (Griswold 1997a, figs. 63, 64).

DESCRIPTION. — See Griswold (1997a:68–72). Note: In the original description (Griswold 1997a:68) the date of collection was erroneously listed as November, not December.

NATURAL HISTORY. — *Alaranea betsileo* are common inside forest hanging beneath sheet webs between 0.2 and 2 m above ground.

DISTRIBUTION. — Known only from montane forests near Ranomafana in Fianarantsoa Province, Madagascar (Fig. 155).

MATERIAL EXAMINED. — MADAGASCAR: **Fianarantsoa**: all from Parc National Ranomafana: Talatakely, montane rain forest, 21°15′S, 47°25′E, elev. 900 m, 5–7 November 1993, N. Scharff, S. Larcher, C. Griswold, and R. Andriamasamanana (♂ holotype and ♀ paratype CASC) (34♂74♀, one pair in MRAC, remainder divided among CASC, USNM, and ZMUC), 5–18 April 1998 (1♂6♀ CASC), 19–30 April 1998 (2♂2♀) (all C. Griswold, D. Kavanaugh, N. Penny, M. Raherilalao, J. Ranorianasoa, J. Schweikert and D. Ubick), 30 October–20 November 1998, V. Lee and K Ribardo (2♂ CASC); Vohiparara, 21°14′S, 47°24′E, elev. 900 m, 5–7 December 1993, N. Scharff, S. Larcher, C. Griswold, and R. Andriamasamanana (6♂6♀ CASC, ZMUC, USNM), 10–29 April 1998, C. Griswold, D. Kavanaugh, N. Penny, M. Raherilalao, J. Ranorianasoa, J. Schweikert and D. Ubick (18♂18♀ CASC); Vatoharanana, primary forest, 21 16.7′S, 47 26.1′E, elev. 1200 m, 15 April 1998, C. Griswold, D. Kavanaugh, N. Penny, M. Raherilalao, J. Ranorianasoa, J. Schweikert and D. Ubick (1♂3♀ CASC); 200 m N research Cabin, trail G, beating, 23 March 1992, S. Kariko, V. Roth (1♂2♀ CASC) (2♂2♀ MCZ), 25 March 1992, beating in forest, Emile Rajeriarison (1♂4♀ CASC) (4♂12♀ MCZ); 200 m N research Cabin, trail G, beating, 25 December 1992, B. Roth (2♂4♀ CASC), 21°12′S; 47°27′E, from foliage, elev. 1000 m, April 1992, V. and B. Roth (4♀ CASC) (3♀ MCZ); 7 km W Ranomafana, elev. 900 m, 21°12′S; 47°27′E, 20–24 March 1990, W. Steiner (2♂ USNM), elev. 1100 m, 8–21 October 1988 (1♂1♀ USNM) 21–30 October 1988 (1♂ USNM) 1–7 November 1988 (2♂ USNM) all W. Steiner.

Alaranea merina Griswold, 1997
Figures 8B; 51D; 53A–D; 55B, D, F; 56F; 155

A. merina Griswold 1997a:72 (♂ holotype from Parc National Perinét, Madagascar, CASC type #17334, examined).

DIAGNOSIS. — Distinguished from other *Alaranea* by having the conductor simple, with the proximal point narrower than cup (Fig. 53C; Griswold 1997a, figs. 70–72); dorsum of abdomen with sinuate longitudinal dark bands diverging from apex to middle and converging posteriorly (Fig. 51D; Griswold 1997a, figs. 65, 66). There seem to be no consistent characters to separate females of *Alaranea merina* from *A. ardua* Griswold, though in the former the carapace is pale yellow-brown with darker markings along the borders of the pars cephalica (Griswold 1997a, fig. 66), whereas the carapace of *A. ardua* tends to be darker (Griswold 1997a, fig. 96).

Description. — See Griswold 1997a:72–76.

Natural History. — *Alaranea merina* are common inside forest hanging beneath sheet webs between 0.2 and 2 m above ground.

Distribution. — Widespread in mid elevation forests along the eastern side of the Madagascar escarpment (Fig. 155).

Material Examined. — MADAGASCAR: **Fianarantsoa**: 43 km S Ambalavao, Reserve Andringitra, 22°14′S, 47°00′E, elev. 825 m, sifted litter, rainforest, 5 October 1993, B. L. Fisher (1♂ CASC); Massif Andringitra, Mahasoa, elev. 2100 m, October 1971, B. Ranson (1♀ MRAC); all Parc National de Ranomafana: around research cabin, 26 March 1992, V. and B. Roth, S. Kariko (2♂3♀ MCZ), from foliage, ca. 21°12′S, 47°27′E, elev. ca. 1000 m, April 1992, V. and B. Roth, S. Kariko (1♂3♀ CASC), 7 km W Ranomafana, elev. 1100 m, 22–31 October 1988, W. E. Steiner (1♀ USNM), 1–7 November 1988, W. E. Steiner (2♂3♀ USNM), elev. 1200 m, 22 October 1988, W. Steiner, C. Kremen, R. Van Epps (1♀ USNM), Vohiparara, ca. 21°14′S, 47°24′E, elev. 1100 m, 5–7 November 1993, J. Coddington, N. Scharff, S. Larcher, C. Griswold, R. Andriamasamanana (4♀ CASC, USNM, ZMUC), 18–27 April 1998, C. Griswold, D. Kavanaugh, N. Penny, M. Raherilalao, J. Ranorianasoa, J. Schweikert and D. Ubick (3♀ CASC), Talatakeley, 21°15′S: 47°25′E, elev. 900 m, 5–7 December 1993, C. Griswold, N. Scharff, S. Larcher, and R. Andriamasamanana (7♂21♀ CASC, USNM, ZMUC), 5–18 April 1998 (2♀ CASC), 19–30 April 1998 (1♂2♀ CASC) (all C. Griswold, D. Kavanaugh, N. Penny, M. Raherilalao, J. Ranorianasoa, J. Schweikert and D. Ubick), Vatoharanana, primary forest, 21°16.7′S, 47°26.1′E, elev. 1200 m, 29 April 1998, C. Griswold (1♀ CASC). **Toamasina**: Parc National Perinét, near Andasibe, 18°56′S, 48°24′E, elev. 1000 m, montane rain forest, 4–5 November 1993, J. Coddington, S. Larcher, C. Griswold, R. Andriamasamanana, and N. Scharff (♂ holotype and ♀ paratype CASC) (39♂29♀ CASC, USNM, ZMUC); Perinét, 18°55′S, 48°25′E, 1–3 August 1992, V. and B. Roth (1♀ CASC); Forêt de Didy, arbustes, March 1947 (1♂ MNHN); Mandraka, battage, December 1946, J. Millot (3♂7♀ MNHN); Beanana, 15°44′S, 49°28′E, February 1970, A. Lambillon (1♂ MRAC).

Buibui **new genus**

Type Species. — *Buibui claviger* new species.

Etymology. — Swahili for spider; gender feminine.

Monophyly and Phylogenetic Placement. — Synapomorphies are the round abdomen (18:1) (reversed in *B. abyssinica*) and hooked PEP form (41:2); the sclerotized tissue surrounding the coxae (13:1) suggests that *Buibui* is the sister group of a clade containing the African genera *Uvik*, *Wanzia*, *Isicabu*, and *Scharffia* and the Malagasy *Alaranea*.

Diagnosis. — Distinguished from all other cyatholipid genera except *Alaranea*, some *Isicabu*, *Matilda*, *Scharffia*, *Toddiana*, *Uvik*, and *Wanzia* by having sclerotizations surrounding the coxae, and from *Alaranea*, *Matilda*, *Scharffia*, and *Wanzia* by lacking an abdominal petiole (Figs. 57A, 59A, 63). Males are distinguished from *Isicabu*, *Toddiana*, and

Uvik by having the PEP fleshy, pustulate, toothed at base, and distally hooked (Figs. 13D, 66D), and females are distinguished from these genera by having the vulval AD sclerotized, hemispherical, simple, and small (Fig. 64A–D).

DESCRIPTION. — Total length 1.90–2.70. Carapace oval in dorsal view (Figs. 57C, 59B), length 1.25–1.62 times width, maximum height 0.38–0.56 times width, profile evenly curved (Figs. 57A, 59A, 63); texture rugose (Fig. 4D), thoracic fovea a shallow oval to a deep pit; carapace posterior margin truncate to weakly concave (Fig. 59B); ocular area (Fig. 4D) with PER width 2.10–2.62 times OAL, 2.28–2.80 times OQP, OQP 0.84–1.12 times OQA; diameter AME 0.95–1.50 times PME, distance PME–PLE 1.00–1.80 times PME diameter; clypeal height 1.37–3.14 times AME diameter, cheliceral length 1.45–3.00 times clypeal height; chelicerae convex basally, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum rugose (Fig. 59C), length 0.91–1.04 times width, coxae surrounded by sclerotized cuticle (Fig. 63). Abdomen round (Figs. 59A, 63) or triangular (Fig. 57A), sclerotized only ventrally between pedicel and epigastric furrow, not petiolate; abdominal setae fine; spinnerets typical. Leg formula 1243, with femur I 1.53–3.40 times carapace width, male metatarsus I may be modified (Fig. 7C–E). Male palpus with cymbial RMP pointing ventrad (Fig. 65A), smaller than paracymbium, PC broad in lateral view (Fig. 60B, E); palpal bulb (Fig. 13A–D) with MLT large, wider than one-half width of tegulum, with transversely oval denticulate patch, apex a pustulate lobe; C median, longitudinal, bipartite, inner margin fimbriate proximally, lower process thick; embolus arising at 2 o'clock, thick, length less than one rotation, pars pendula extending for most of length, base smooth, PEP (Figs. 13D, 66D) fleshy, pustulate, with basal teeth, distally hooked; reservoir with curlicue near embolic base. Epigynum (Fig. 58A–F) with scape and median hood, septum between copulatory openings narrow (Fig. 58A, E), anterior margin of atrium confluent with S, median lobe parallel sided; vulva (Fig. 64) with AD sclerotized, hemispherical, about equal to HS, fertilization duct posterior.

NATURAL HISTORY. — See under each species.

DISTRIBUTION. — Montane equatorial Africa: Cameroon to Kenya and north to Ethiopia.

COMPOSITION. — Five species.

Buibui abyssinica, new species

Figures 7D, E; 13A–D; 57A–C; 58A–C; 60A–C; 68A, C, E; 151

TYPES. — Male holotype and female paratype from Ethiopia, beneath scarp at elev. ca. 2400 m on Debre Birhan Rd. 20 km E of Addis Ababa, in litter of semi-evergreen scrub, 15 March 1987, A. Russell-Smith, deposited in CASC.

ETYMOLOGY. — From Ethiopia.

DIAGNOSIS. — Distinguished from other *Buibui* by having the abdomen trapezoidal to triangular when viewed laterally (Fig. 57A), posteriorly overhanging spinnerets; males have metatarsus I twisted (Figs. 7D, E, 57A) and the tegular apex raised (Fig. 60A).

MALE (holotype): Total length 2.55. Carapace red-brown (Fig. 58A), faintly mottled with black on pars cephalica, black surrounding AME, PME, and lateral eyes, faint black reticulations radiating from fovea; clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, clypeus dusky along oral margin, sternum red-brown; coxae and trochanters yellow-white, legs yellow-brown, unmarked except dusky on sides of femora distally, basally on patellae, and as apical annuli on tibiae and metatarsi, pedipalpi yellow-white except apex of tibia and cymbium dark grey; abdomen pale grey, with longitudinal dorsal and lateral dark grey bands meeting posteriorly, dorsal bands forming chevrons posteriorly, venter brown between pedicel and epigastric furrow, dark grey posteriorly. Carapace 1.13 long, 0.69 wide, 0.38 high, weakly concave posteriorly, thoracic fovea a small, deep pit; PER 0.43 wide, AER 0.42 wide, OAL 0.18; ratio AME:ALE:PME:PLE, 1.30:1.30:1.00:1.40, PME diameter 0.05. Clypeus 0.19 high, chelicerae 0.35 long. Sternum 0.57 long, 0.53 wide; labium 0.13 long, 0.15 wide; pedipalpal coxae 0.21 long, 0.17 wide. Metatarsus I swollen and twisted subapically (Figs. 7D, E; 57A). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.38 + 0.28 + 2.32 + 1.45 + 1.08 = [7.51]; II: 1.49 + 0.25 + 1.47 + 0.87 + 0.81 = [4.89]; III: 0.70 + 0.19 + 0.64 + 0.53 + 0.45 = [2.51]; IV: 1.06 + 0.23 + 0.85 + 0.68 + 0.45 = [3.27]; pedipalpus: 0.34 + 0.15 + 0.10 + (absent) + 0.33 = [0.92]. Abdomen triangular, overhanging spinnerets posteriorly (Fig. 57A). Palp with cymbial RMP narrowly conical (Fig. 60B); tegulum apex a raised lobe, pustulate prolaterally and projecting retrolaterally (Figs. 13A–C, 60A), MLT denticulate patch covering two thirds of length, PEP distally simple (Fig. 13D).

Variation (N = 4): Total length 2.23–2.55; ratios of carapace length/width 1.50–1.62, height/width 0.53–0.56; ratios of PER/OQP 2.56–2.80, PER/OAL 2.16–2.47, OQP/OQA 0.94–1.07, diameter AME/PME 1.08–1.40; ratios of clypeal height/diameter AME 2.57–2.92, cheliceral length/clypeal height 1.67–1.84; ratio of length femur I/carapace width 3.26–3.40. Palp with cymbial RMP narrowly to bluntly conical.

Female (paratype): Total length 2.66. Markings and structure (Fig. 57B, C) as in male except legs unmodified and abdomen trapezoidal, slightly overhaging spinnerets posteriorly. Carapace 1.07 long, 0.69 wide, 0.37 high; PER 0.42 wide, AER 0.41 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.08:1.00:1.00:1.17, PME diameter 0.06. Clypeus 0.16 high, chelicerae 0.42 long. Sternum 0.54 long, 0.48 wide; labium 0.13 long, 0.20 wide; pedipalpal coxae 0.19 long, 0.14 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.81 + 0.26 + 1.76 + 1.15 + 0.96 = [5.94]; II: 1.23 + 0.25 + 1.19 + 0.76 + 0.68 = [4.11]; III: 0.68 + 0.21 + 0.51 + 0.45 + 0.45 = [2.30]; IV: 0.96 + 0.21 + 0.70 + 0.53 + 0.45 = [2.85]; pedipalpus: 0.27 + 0.08 + 0.13 + (absent) + 0.31 = [0.79]. Epigynum as in Figs. 58A–C and 60 C, median septum very narrow; vulva as in Fig. 68A, C, E, AD slightly smaller than HS.

Variation (N = 3): Total length 2.33–2.66; ratios of carapace length/width 1.43–1.54, height/width 0.45–0.56; ratios of PER/OQP 2.50–2.60, PER/OAL 2.17–2.50, OQP/OQA 0.97–1.00, diameter AME/PME 1.08–1.36; ratios of clypeal height/diameter AME 2.00–2.31, cheliceral length/clypeal height 1.80–2.67; ratio of length femur I/carapace width 2.45–2.68. Intensity and relative extent of abdominal makings vary (Fig. 57C).

Natural History. — Label data suggest occurrence in the understory of montane forest patches, including juniper/broadleaved forest, and in montane grassland.

Distribution. — Central Ethiopia north of the Great Rift Valley (Fig. 151).

Additional Material Examined (all A. Russell-Smith, CASC): ETHIOPIA: **Shoa**: 20 km E Addis Ababa, beneath scarp on Debre Birhan Rd., elev. 2400 m, 15 March 1987 (2♂17♀); 26 km E Addis Ababa on Debre Birhan Rd., elev. 2400 m, 20 June 1987 (3♀); stream valley 16 km E Addis Ababa on Debre Birhan Rd., elev. 2400 m, 5 July 1987 (1♀); 15 km E Addis Ababa, elev. 2400 m, 8 June 1986 (1♀); hillside 10 km E Addis Ababa, elev. 2500 m, 28 June 1987 (1♀); rim of Wonchi Crater near Ambo, elev. 2800 m, 8 April 1988 (1♂); Djemdjem Forest, N of Ginchi, elev. ca. 2600 m, 4 April 1987 (1♂3♀); Djemdjem Forest, N of Ginchi, elev. 2500 m, 4 April 1987 (2♀).

Buibui claviger, new species
Figures 59A–C; 61A–D; 64A; 151

TYPES. — Male holotype from Kenya, Mt. Kenya at the meteorological station, elev. 3050 m, from litter of bamboo, 11 January 1975, Å. Holm, deposited in ZMUU. Female paratype, Aberdare, Kabage Forest Station, elev. 2250 m, 2 March 1969, Å. Holm, deposited in ZMUU.

ETYMOLOGY. — Latin, club bearing.

DIAGNOSIS. — Distinguished from other *Buibui* by having the abdomen round (Fig. 59A–C), femur I < 2.5 × carapace width and the male metatarsus I swollen (Fig. 59A). There are no consistent characters to distinguish among the females of *Buibui* species with round abdomens.

MALE (holotype). — Total length 2.19. Carapace (Fig. 59A) dark red-brown, faintly mottled with black laterally, black surrounding AME, PME, and lateral eyes, clypeus, chelicerae, pedipalpal coxae and labium red-brown; sternum dusky red-brown; coxae and trochanters yellow-brown, legs with femora-tibiae orange-brown, metatarsi and tarsi yellow-brown, femora dusky at base, pedipalpi yellow-white except apex of tibia and cymbium dark brown; abdomen dark grey except yellow-white dorsally indented by anterior, median, and posterior paired dark marks, venter brown between pedicel and epigastric furrow. Carapace 1.16 long, 0.82 wide, 0.34 high, truncate posteriorly, thoracic fovea a small deep pit; PER 0.44 wide, AER 0.43 wide, OAL 0.21; ratio AME:ALE:PME:PLE, 1.28:1.14:1.00:1.21, PME diameter 0.07. Clypeus 0.18 high, chelicerae 0.33 long. Sternum 0.53 long, 0.55 wide; labium 0.11 long, 0.19 wide; pedipalpal coxae 0.21 long, 0.12 wide. Metatarsus I slightly swollen. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.62 + 0.28 + 1.51 + 1.04 + 0.98 = [5.43]; II: 1.15 + 0.23 + 1.11 + 0.74 + 0.68 = [3.91]; III: 0.72 + 0.21 + 0.55 + 0.49 + 0.45 = [2.42]; IV: 0.91 + 0.23 + 0.68 + 0.51+ 0.45 = [2.78]; pedipalpus: 0.31 + 0.13 + 0.11 + (absent) + 0.31 = [0.86]. Abdomen round (Fig. 59A). Palp with cymbial RMP blunt (Fig. 61A); tegulum apex a low pustulate lobe, MLT denticulate patch covering three fourths of length (Fig. 61B, C); PEP distally simple (Fig. 61D).

VARIATION (N = 2). — Total length 1.91–2.19; ratios of carapace length/width 1.26–1.36, height/width 0.41–0.43; ratios of PER/OQP 2.56–2.62, PER/OAL 2.10–2.16, OQP/OQA 0.84–0.94, diameter AME/PME 0.94–1.28; ratios of clypeal height/diameter AME 1.37–1.89, cheliceral length/clypeal height 1.82–3.00; ratio of length femur I/carapace width 1.95–2.00.

FEMALE (paratype). — Total length 2.19. Markings and structure as in male except legs unmodified, and abdomen pale grey, with longitudinal lateral dark grey bands meeting posteriorly and two dorsal rows of dark spots, venter brown between pedicel and epigastric furrow, dark grey posteriorly (Fig. 59B, C). Carapace 1.04 long, 0.75 wide, 0.29 high; PER 0.45 wide, AER 0.43 wide, OAL 0.19; ratio AME:ALE:PME:PLE, 1.28:1.14:1.00:1.21, PME diameter 0.07. Clypeus 0.15 high, chelicerae 0.36 long. Sternum 0.54 long, 0.59 wide; labium 0.10 long, 0.17 wide; pedipalpal coxae 0.19 long, 0.13 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.42 + 0.28 + 1.28 + 0.96 + 0.81 = [4.75]; II: 1.08 + 0.25 + 1.06 + 0.70 + 0.64 = [3.73]; III: 0.66 + 0.19 + 0.51 + 0.47 + 0.45 = [2.28]; IV: 0.87 + 0.23 + 0.68 + 0.53 + 0.42 = [2.73]; pedipalpus: 0.26 + 0.10 + 0.15 + (absent) + 0.31 = [0.82]. Epigynum as in *B. abyssinica* and *B. cyrtata* (Fig. 58A–F); vulva as in Fig. 64A, AD slightly smaller than HS.

VARIATION (N = 3). — Total length 2.13–2.21; ratios of carapace length/width 1.39–1.43, height/width 0.38–0.44; ratios of PER/OQP 2.50–2.62, PER/OAL 2.22–2.47, OQP/OQA 0.89–1.00, diameter AME/PME 1.12–1.28; ratios of clypeal height/diameter AME 1.55–2.62, cheliceral length/clypeal height 1.48–2.43; ratio of length femur I/carapace width 1.75–1.94. Lateral markings of abdomen vary from longitudinal bands to all dark, dorsum with two dorsal rows of 2 to 3 dark spots.

NATURAL HISTORY. — Label data suggest that specimens were taken from leaf litter: it is unknown if the spiders live in the litter or build webs near to the ground.

DISTRIBUTION. — Mount Kenya and the Aberdares, Kenya (Fig. 151).

ADDITIONAL MATERIAL EXAMINED. — KENYA: **Central**: Mt. Kenya, Kabaru Forest Station, elev. 2250 m, 26 February 1969, Å. Holm (1♀ ZMUU); Mt. Kenya, July 1975, R. Bosmans (1♂1♀ MRAC); Aberdare, Kabage, Forest Station, elev. 2250 m, 2 March 1969, Å. Holm (1♀ ZMUU).

Buibui cyrtata, new species
Figures 4D; 7C; 58D–F; 62A–D; 64B; 151

TYPES. — Male holotype from Congo D. R., face N. du Ruwenzori, dans mousses, camp du Kanzuiri, Karibumba, elev. 3700 m, July–August 1974, M. Lejeune collector, MRAC 154.899, deposited in MRAC. Paratypes, 3 females, same data (except elev. 3500 m), 2 deposited in MRAC, 1 in CASC.

ETYMOLOGY. — Latinized from the Greek *kyrtos*, twisted, referring to the form of the male metatarsus I.

DIAGNOSIS. — Distinguished from other *Buibui* by having the abdomen round, femur I > 2.5 × carapace width, male metatarsus I swollen and kinked subapically (Fig. 7C), and male metatarsus II sinuate subapically. There are no consistent characters to distinguish among the females of *Buibui* species with round abdomens.

MALE (holotype). — Total length 2.47. Carapace red-brown, faintly mottled with black with three slender longitudinal lines on pars cephalica and with reticulations radiating laterally from fovea, black surrounding AME, PME, and lateral eyes, clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, sternum dusky orange-brown; coxae and trochanters yellow-white, legs with femur I yellow-brown, otherwise yellow-white, femora with basal and apical dark annuli, patellae dark basally, tibiae and metatarsi dark apically, pedipalpi yellow-white except apex of tibia and cymbium dark grey; abdomen pale yellow-grey, with lateral dark grey bands nearly meeting posteriorly, dorsally with pair of longitudinal dark lines broken into two spots posteriorly, and venter brown between pedicel and epigastric furrow, dark grey posteriorly. Carapace 1.23 long, 0.90 wide, 0.42 high, truncate posteriorly, thoracic fovea a small, deep pit; PER and AER 0.54 wide, OAL 0.22; ratio AME:ALE:PME:PLE, 1.28:1.28:1.00:1.28, PME diameter 0.07. Clypeus 0.22 high, chelicerae 0.43 long. Sternum 0.61 long and wide; labium 0.14 long, 0.23 wide; pedipalpal coxae 0.24 long, 0.19 wide. Metatarsus I swollen and kinked subapically (Fig. 7C), metatarsus II sinuate subapically. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.57 + 0.36 + 2.02 + 1.45 + 1.21 = [7.61]; II: 1.66 + 0.32 + 1.76 + 1.08 + 0.85 = [5.67]; III: 1.04 + 0.28 + 0.83 + 0.70 + 0.57 = [3.42]; IV: 1.32 + 0.28 + 1.04 + 0.83 + 0.57 = [4.04]; pedipalpus: 0.45 + 0.13 + 0.15 + (absent) + 0.35 = [1.08]. Abdomen round. Palp with cymbial RMP narrowly conical (Fig. 62B); tegulum apex a broad, pustulate lobe, weakly pustulate prolaterally, MLT denticulate patch extensive, covering three fourths of length (Fig. 62A, C); PEP distally simple (Fig. 62D).

FEMALE (paratype). — Total length 2.64. Markings and structure as in male except legs unmodified. Carapace (Fig. 4D) 1.18 long, 0.89 wide, 0.42 high; PER and AER 0.54 wide, OAL 0.23; ratio AME:ALE:PME:PLE, 1.50:1.67:1.00:1.33, PME diameter 0.06. Clypeus 0.21 high, chelicerae 0.47 long. Sternum 0.62 long, 0.63 wide; labium 0.15 long, 0.23 wide; pedipalpal coxae 0.26 long, 0.16 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.19 + 0.36 + 2.21 + 1.34 + 1.06 = [7.16]; II: 1.53 + 0.39 + 1.49 + 1.04 + 0.79 = [5.24]; III: 0.98 + 0.30 + 0.72 + 0.66 + 0.53 = [3.19]; IV: 1.23 + 0.30 + 0.94 + 0.70 + 0.55 = [3.72]; pedipalpus: 0.37 + 0.14 + 0.20 + (absent) + 0.42 = [1.13]. Epigynum as in Fig. 58D–F; vulva as in Fig. 64B, AD slightly larger than HS.

VARIATION (N = 3). — Total length 2.55–2.64; ratios of carapace length/width 1.32–1.39, height/width 0.41–0.51; ratios of PER/OQP 2.43–2.68, PER/OAL 2.22–2.60, OQP/OQA 0.95–1.05, diameter AME/PME 1.00–1.50; ratios of clypeal height/diameter AME 1.60–2.22, cheliceral length/clypeal height 2.25–2.56; ratio of length femur I/carapace width 2.23–2.42. Abdomen with dorsal pair of longitudinal dark lines entire or broken into one to two spots posteriorly; laterally all dark or marked with band.

NATURAL HISTORY. — Label data suggest that specimens were taken from mosses, litter beneath ferns, and suspended soil.

DISTRIBUTION. — Ruwenzori Mountains, Congo D. R. (Fig. 151).

ADDITIONAL MATERIAL EXAMINED. — CONGO D. R.: **Kivu**: Ruwenzori, Route Lubero, Butembo, région de Lukaga, forêt de Kasumbira, elev. 2150 m, December 1974–January 1975, R. P. M. Lejeune (1♀ MRAC); Butembo, elev. 1750 m, February–March 1975, R. P. M. Lejeune (1♀ MRAC); Ruwenzori, Bujuku Valley, Bigo, elev. 3500 m, 5 April 1948, Å. Holm (1♀ ZMUU).

Buibui kankamelos, new species
Figures 63; 64C; 65A–C; 151

TYPES. — Male holotype from Mt. Cameroon, Cameroon, near Buea, 1500 m, montane forest, 26 February 1981, Bosmans and Van Stalle collectors, deposited in MRAC. Female paratype from Mt. Cameroon, near Buea, degraded montane forest at 1300 m, 26 February 1981, Bosmans and Van Stalle collectors, MRAC.

ETYMOLOGY. — From the Bakweri word for spider.

DIAGNOSIS. — Distinguished from other *Buibui* by having the abdomen round, legs unmodified, femur I > 2.5 × carapace width (Fig. 63), and the denticulate patch of MLT covering two thirds of length (Fig. 65B). There are no consistent characters to distinguish among the females of *Buibui* species with round abdomens.

MALE (holotype). — Total length 1.96. Carapace red-brown, faintly mottled with black on pars cephalica, black surrounding AME, PME, and lateral eyes, clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, sternum red-brown; coxae and trochanters yellow-white, legs yellow-brown, unmarked, pedipalpi yellow-white except apex of tibia and cymbium dark grey; abdomen pale grey, with longitudinal dorsal and lateral dark grey bands meeting posteriorly, venter brown between pedicel and epigastric furrow, dark grey posteriorly (Fig. 63). Carapace 1.05 long, 0.55 wide, 0.33 high; thoracic fovea a shallow oval; PER 0.44 wide, AER 0.42 wide, OAL 0.18; ratio AME:ALE:PME:PLE, 1.38:1.23:1.00:1.08, PME diameter 0.07. Clypeus 0.20 high, chelicerae 0.39 long. Sternum 0.51 long, 0.50 wide; labium 0.09 long, 0.18 wide; pedipalpal coxae 0.18 long, 0.14 wide. Legs unmodified; measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.34 + 0.28 + 2.36 + 1.57 + 0.96 = [7.51]; II: 1.55 + 0.28 + 1.51 + 0.94 + 0.74 = [5.02]; III: 0.83 + 0.21 + 0.66 + 0.55 + 0.47 = [2.72]; IV: 1.08 + 0.23 + 0.89 + 0.64 + 0.42 = [3.26]; pedipalpus: 0.30 + 0.11 + 0.10 + (absent) + 0.29 = [0.80]. Abdomen round. Palp with cymbial RMP conical (Fig. 65A); tegulum apex a broad, low pustulate lobe, MLT denticulate patch covering two thirds of length (Fig. 65B); PEP distally hooked (Fig. 65C).

FEMALE (paratype). — Total length 2.13. Markings and structure as in male except thoracic fovea with a deep posterior pit. Carapace 1.02 long, 0.71 wide, 0.36 high; PER 0.43 wide, AER 0.41 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.08:1.23:1.00:1.08, PME diameter 0.07. Clypeus 0.19 high, chelicerae 0.29 long. Sternum 0.50 long and wide; labium 0.09 long, 0.20 wide; pedipalpal coxae 0.17 long, 0.11 wide. Legs broken off at patellae (femur measurements): I: 1.81; II: 1.30; III: 0.70; IV: 1.08; pedipalpus: 0.23. Epigynum as in *B. abyssinica* and *B. cyrtata* (Fig. 58A–F); vulva as in Fig. 64C, AD equal to HS.

VARIATION (N = 2): Total length 2.00–2.13; ratios of carapace length/width 1.25–1.43, height/width 0.45–0.50; ratios of PER/OQP 2.28–2.31, PER/OAL 2.31–2.56, diameter AME/PME 1.08–1.10; ratios of clypeal height/diameter AME 1.64–2.57, cheliceral length/clypeal height 1.55–2.00; ratio of length femur I/carapace width 2.15–2.50.

NATURAL HISTORY. — Label data record occurrence in intact and degraded montane forest.

DISTRIBUTION. — Mt. Cameroon and Bioko Island, central Africa (Fig. 151).

ADDITIONAL MATERIAL EXAMINED. — EQUATORIAL GUINEA: **Bioko**: Pico Basilé, 3°37′38″N, 8°48′15″E, elev. 1750 m, 27–29 September 1998, D. Ubick and K. Dabney (1♀ CASC).

Buibui orthoskelos, new species
Figures 60D, E; 64D; 66A–D; 151

TYPES. — Male holotype and female paratype from Congo D. R., N. Kivu, Reserve du Kasongwere (près de Ishango), elev. 2600 m, 1 April 1970, R. P. M. Lejeune, deposited in MRAC. Paratype male, same data, deposited in CASC.

ETYMOLOGY. — Greek *orthos* straight, *skelos* leg.

DIAGNOSIS. — Distinguished from other *Buibui* by having the abdomen round, femur I < 2.5 × carapace width, and male legs unmodified. There are no consistent characters to distinguish among the females of *Buibui* species with round abdomens.

MALE (holotype). — Total length 2.45. Carapace dark red-brown, faintly mottled with black on pars cephalica, with narrow dark stripe anteriad of thoracic fovea and faint radii extending from thoracic fovea on pars thoracica, black surrounding AME, PME, and lateral eyes, clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, clypeus dusky in center at oral margin, sternum red-brown; coxae and trochanters yellow-white, legs yellow-brown, unmarked except for dusky annuli basally on all femora and apically on femora and tibae III and IV, pedipalpi yellow-white except cymbium dark grey-brown; abdomen dark grey, with longitudinal dorsomedian and dorsolateral pale grey bands meeting posteriorly, dorsolateral bands broken into spots posteriorly, venter brown between pedicel and epigastric furrow. Carapace 1.22 long, 0.86 wide, 0.42 high, truncate posteriorly, thoracic fovea an oval pit; PER 0.50 wide, AER 0.48 wide, OAL 0.20; ratio AME:ALE:PME:PLE, 1.28:1.14:1.00:1.21, PME diameter 0.07. Clypeus 0.23 high, chelicerae 0.34 long. Sternum 0.52 long, 0.55 wide; labium 0.15 long, 0.20 wide; pedipalpal coxae 0.21 long, 0.17 wide. Legs unmodified; measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.59 + 0.39 + 1.53 + 1.13 + 0.89 = [5.53]; II: 1.23 + 0.28 + 1.11 + 0.83 + 0.74 = [4.19]; III: 0.79 + 0.25 + 0.55 + 0.53 + 0.51 = [2.63]; IV: 1.04 + 0.25 + 0.81 + 0.66 + 0.49 = [3.25]; pedipalpus: 0.35 + 0.13 + 0.13 + (absent) + 0.38 = [0.99]. Abdomen round. Palp with cymbial RMP short, conical (Fig. 60E); tegulum apex a broad, pustulate lobe, MLT denticulate patch covering two thirds of length (Figs. 60D, 66A–C); PEP distally hooked and bifid (Fig. 66D).

VARIATION (N = 3). — Total length 2.08–2.45; ratios of carapace length/width 1.35–1.41, height/width 0.45–0.49; ratios of PER/OQP 2.31–2.51, PER/OAL 2.20–2.53, OQP/OQA 1.00–1.12, diameter AME/PME 1.17–1.28; ratios of clypeal height/diameter AME 2.44–3.14, cheliceral length/clypeal height 1.45–1.50; ratio of length femur I/carapace width 1.54–1.83; apex of PEP hook may be simple or bifid; abdomen with longitudinal light bands entire or broken into spots.

FEMALE (paratype). — Total length 2.42. Markings and structure as in male except dorsal light markings of abdomen more extensive. Carapace 1.04 long, 0.77 wide, 0.37 high; PER 0.44 wide, AER 0.43 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.33:1.17:1.00:1.33, PME diameter 0.06. Clypeus 0.19 high, chelicerae 0.38 long. Sternum 0.51 long, 0.62 wide; labium 0.14 long, 0.19 wide; pedipalpal coxae 0.21 long, 0.14 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.30 + 0.25 + 1.15 + 0.83 + 0.74 = [4.27]; II: 0.96 + 0.23 + 0.85 + 0.85 + 0.62 = [3.51]; III: 0.66 + 0.21 + 0.45 + 0.45 + 0.42 = [2.19]; IV: 0.94 + 0.23 + 0.68 + 0.55 + 0.45 = [2.85]; pedipalpus: 0.26 + 0.10 + 0.15 + (absent) + 0.33 = [0.84]. Epigynum as in *B. abyssinica* and *B. cyrtata* (Fig. 58A–F); vulva as in Fig. 64B, AD equal to HS.

VARIATION (N = 2). — Total length 2.28–2.42; ratios of carapace length/width 1.35–1.38, height/width 0.47–0.48; ratios of PER/OQP 2.44–2.47, PER/OAL 2.59–2.62, diameter AME/PME 1.17–1.33; ratios of clypeal height/diameter AME 2.25–2.53, cheliceral length/clypeal height 2.00–2.35; ratio of length femur I/carapace width 1.53–1.67.

NATURAL HISTORY. — Label data indicate that specimens were taken from leaf litter and by beating or sweeping, suggesting that the spiders build webs near to the ground.

DISTRIBUTION. — Known only from uplands along the Albertine Rift in far eastern Congo D. R. (Fig. 151).

ADDITIONAL MATERIAL EXAMINED. — CONGO D. R.: **Kivu**: Mt. Lubwe, SE of Butembo, elev. 2040 m, 12 April 1971, R. P. M. Lejeune (1♂ MRAC); Terr. Lubere, Réserve forest de laBiena, April 1969, R. P. M. Lejeune (1♂ MRAC); Dorrah de Lubero, Mt. Lubwe, elev. 2320 m, 5 August 1963, R. P. M. Lejeune (1♀ MRAC).

Cyatholipus Simon, 1894

Cyatholipus Simon 1894:712 (type species, by original designation, *C. hirsutissimus* Simon 1894, from the western Karoo, South Africa). Petrunkevitch 1928:144. Roewer 1942:968. Bonnet 1956:1296. Griswold 1987c:505. Platnick 1989:181. Platnick 1993:172.

Moero Cambridge, 1903 (type species, by monotypy, *M. quadrimaculata* O. P. Cambridge, 1903, from Cape of Good Hope, South Africa). Petrunkevitch 1928:233. Roewer 1942:457. First synonymized by Petrunkevitch 1928.

NOTE. — *Cyatholipus dentipes* Simon, 1894 is the type of the new genus *Pokennips*.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Autapomorphies are the round abdomen (18:1), PEP pustules (42:1), and loss of PEP teeth (43:0). The sclerotized cuticle surrounding male pedicel (19:1), coarse, long and stout abdominal setae (24:1), and denticulate retrolateral surface of the conductor (34:1) are synapomorphies uniting *Cyatholipus* with the Australian genus *Teemenaarus*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Hanea*, *Ilisoa*, *Lordhowea*, *Matilda*, *Pokennips*, *Tekella*, and *Umwani* by having the abdomen round in lateral view, from all but *Ilisoa*, *Matilda*, and *Pokennips* by having the abdomen with coarse setae, and from *Matilda* by lacking a dorsal abdominal scutum (Fig. 67A–C). Males are distinguished from *Ilisoa* and *Pokennips* by having the C denticulate on the retrolateral surface (Figs. 69B, 70C), and females from these genera by having the epigynum with the scape arising at apex of the atrium (Fig. 70B, D) and the vulval AD sclerotized (Fig. 68B, D, F).

DESCRIPTION. — Total length 1.50–2.30. Carapace oval in dorsal view (Fig. 67C), length 1.10–1.30 times width, profile evenly curved (Fig. 67A), maximum height 0.42–0.61 width, texture finely granulate, thoracic fovea ranges from shallow and indistinct to a deep, broad pit; carapace posterior margin concave to truncate; ocular area with PER width 2.10–2.42 times OAL, 1.60–2.40 times OQP, OQP 0.95–1.30 times OQA; diameter AME 1.00–1.20 times PME, distance PME–PLE 1.14–1.50 times PME diameter; clypeal height 2.00–3.70 times AME diameter, cheliceral length 1.24–2.42 times clypeal height; chelicerae convex basally, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum smooth to pustulate (Fig. 67B), length 0.76–0.95 times width, coxae surrounded by unsclerotized cuticle. Abdomen (Fig. 67A–C) round, sclerotized around pedicel, entire in male, divided into upper and lower portions in female, not petiolate; abdominal setae long, coarse, bases of a few anterior setae well developed as picks; spinnerets typical (Griswold 1987c, fig. 18). Legs of most species short, unmodified, femur I 1.15–1.75 times carapace width, leg formula 1243. Male palpus with cymbial RMP pointing ventrad (Fig. 69C), smaller than PC; palpal bulb with MLT smooth or with oval denticulate patch (Figs. 69A, 70A), apex a low to raised lobe; C median, longitudinal, denticulate retrolaterally (Figs. 69B, 70C), simple but may be prolonged proximally; E with thick pars pendula, length less than 1 rotation, base in most species wrinkled, origin at two o'clock; PEP present (Fig. 69D), fleshy, reservoir with single curlicue near embolic base. Epigynum (Fig. 70B, D) with S and MH, atrial furrows extend to S; median lobe parallel sided. Vulva (Fig. 68B, D, F) AD equal to HS, sclerotized, hemispherical; FD posterior.

COMPOSITION. — Six species.

NATURAL HISTORY. — See beneath each species below.

DISTRIBUTION. — South Africa (Fig. 158).

Cyatholipus avus Griswold, 1987
Figures 67B, C; 70D; 158

C. avus Griswold 1987c:512 (holotype ♂ from Grootvadersbosch Forest Station, South Africa, NMSA type #3389, examined). Platnick 1989:181.

DIAGNOSIS. — Females are distinguished from other *Cyatholipus* by having the epigynum (Fig. 70D; Griswold 1987c, figs. 45–47) with S narrow, simple, lacking anterior transverse ridge, the atrium narrow, width 1.40 times length; males are distinguished from other *Cyatholipus* by having the pedipalpus with the MLT low and pustulate, the C crescentic, and the PEP slender and convoluted (Griswold 1987c, figs. 36–38).

DESCRIPTION. — See Griswold (1987c:512–514).

NATURAL HISTORY. — The types were collected in moist montane forest.

DISTRIBUTION. — Known only from the type locality in the southwestern Cape region of South Africa (Fig. 158).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Swellendam District, Grootvadersbosch Forest Station, 20 km WNW Heidelberg, elev. 1600 ft., 8–10 November 1985, C. Griswold (holotype ♂ and paratype ♀ NMSA), Grootvadersbosch, August 1962, N. Leleup (3♀ MRAC).

Cyatholipus hirsutissimus Simon, 1894
Figure 158

C. hirsutissimus Simon 1894:712 (type ♀ from Matjiesfontein, South Africa, MNHN #16724, examined). Roewer 1942:968. Bonnet 1956:1296. Griswold 1987c:507. Platnick 1989:181.

DIAGNOSIS. — Females (Griswold 1987c, figs. 1, 2) are distinguished from other *Cyatholipus* by having the abdomen dark grey with transverse dorsal light markings, the legs relatively elongate, femur I length greater than 1.40 times carapace length, with many long, slender setae on all surfaces; male unknown.

DESCRIPTION. — See Griswold (1987c:507–508).

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Known only from the type locality in the western Karoo, South Africa (Fig. 158).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Matjiesfontein (type ♀ MNHN).

Cyatholipus icubatus Griswold, 1987
Figure 158

C. icubatus Griswold 1987c:514 (holotype ♀ from Dlinza Forest, Eshowe, South Africa, NMSA type #3390, examined). Platnick 1989:181.

DIAGNOSIS. — Females (Griswold 1987c, fig. 5) are distinguished from other *Cyatholipus* by having the epigynal S with an anterior transverse ridge that is narrow in posterior view, height of ridge 0.80 width (Griswold 1987c, figs. 48–50); male unknown.

DESCRIPTION. — See Griswold (1987c:514–516).

NATURAL HISTORY. — The type was collected in the understory of moist forest.

DISTRIBUTION. — Known only from the type locality in Zululand, South Africa (Fig. 158).

MATERIAL EXAMINED. — SOUTH AFRICA: **Kwazulu-Natal**: Dlinza Forest, Eshowe, elev. 1800 ft., 21 January 1984, C. Griswold (♀ holotype NMSA).

Cyatholipus isolatus Griswold, 1987
Figures 67A; 68B, D, F; 69A–D; 70A–C; 158

C. isolatus Griswold 1987c:516 (♀ holotype from Hanglip Forest Reserve, South Africa, TMSA #15512, examined). Platnick 1989:182.

NOTE. — The male is described here for the first time.

DIAGNOSIS. — Females are distinguished from other *Cyatholipus* by having the epigynal S with an anterior, transverse ridge that is broad in posterior view, height 0.50 width (Fig. 70D); males are distinguished from other *Cyatholipus* except *C. tortilis* by having the MLT with a raised marginal flange, and from *C. tortilis* by having the C longer, broader, and produced proximally (Figs. 69A–D; 70A, C).

MALE (Hanglipbos). — Total length 1.85. Carapace, chelicerae, pedipalpal coxae, labium and sternum orange-brown, black surrounding eyes and extending between AME and PME; coxae, legs, and pedipalpi yellow-brown, unmarked; abdomen white with two lateral and one ventral black spots, sclerotized from epigastric furrow to and surrounding pedicel and around spinnerets (Fig. 67A). Carapace 0.94 long, 0.76 wide, 0.31 high; PER 0.43 wide, AER 0.41 wide, OAL 0.20; ratio AME:ALE:PME:PLE, 1.14:1.00:1.00:1.14, PME diameter 0.07; clypeus 0.19 high, chelicerae 0.28 long. Sternum 0.42 long, 0.50 wide; labium 0.10 long, 0.19 wide; pedipalpal coxae 0.18 long, 0.11 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 0.81 + 0.23 + 0.72 + 0.64 + 0.51 = [2.91]; II: 0.72 + 0.23 + 0.62 + 0.59 + 0.42 = [2.58]; III: 0.59 + 0.21 + 0.45 + 0.45 + 0.36 = [2.06]; IV: 0.77 + 0.23 + 0.59 + 0.51 + 0.40 = [2.50]; pedipalpus: 0.34 + 0.11 + 0.09 + (absent) + 0.31 = [0.85]. Palp with cymbial RMP short, sharp (Fig. 69A), PC broad in lateral view; tegulum apex pustulate, MLT partially encircled by raised flange; C large, length nearly 0.50 length of tegulum (Figs. 69A–C; 70A, C); PEP slender, twisted, forked apically (Fig. 69D).

FEMALE. — See Griswold (1987c:507–508).

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Known only from the Soutpansberg Mountains in extreme northern South Africa (Fig. 158).

MATERIAL EXAMINED. — SOUTH AFRICA: **Northern**: Soutpansberg District, Hanglip Forest Reserve, Soutpansberg, 18 March 1973, S. Endrödy-Younga (♀ holotype TMSA), forêt du Hanglipbos, August 1962, N. Leleup (1♂ MRAC).

Cyatholipus quadrimaculatus Simon, 1894
Figure 158

Cyatholipus quadrimaculatus Simon, 1894:713 (lectotype ♂ from Cape of Good Hope, South Africa, MNHN #16581, examined). Roewer 1942:968. Bonnet 1956:1296. Griswold 1987c:508. Platnick 1989:182.

Moero quadrimaculata Cambridge, 1903 (syntypes, ♂♀, from Platteklip Gorge, Table Mountain, South Africa, UMO, examined). Petrunkevitch 1928:233. Roewer 1942:457. Griswold 1987c:508.

DIAGNOSIS. — Females are distinguished from other *Cyatholipus* by having the epigynum broad, with atrium width greater than 1.50 times length, and the S narrow (Griswold 1987c, fig. 42–44); males are distinguished from other *Cyatholipus* by having the MLT low and denticulate, the C crescentic, and the PEP broad and folded (Griswold 1987c, figs. 20, 21, 27).

DESCRIPTION. — See Griswold (1987c:507–508).

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Cape of Good Hope, South Africa (Fig. 158).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Cape of Good Hope (*Cyatholipus quadrimaculatus* lectotype ♂, paralectotypes 1♀2♂ MNHN); Platteklip Gorge, Table Mountain (*Moero quadrimaculata* syntype ♂♀ UMO).

Cyatholipus tortilis Griswold, 1987
Figures 3D; 158

C. tortilis Griswold, 1987c:510 (holotype ♂ from Cathedral Peak Forest Station, South Africa, NMSA type #3517, examined). Platnick 1989:182.

DIAGNOSIS. — Males are distinguished from other *Cyatholipus* except *C. isolatus* by having the MLT with a raised marginal flange, and distinguished from *C. isolatus* by having the PEP twisted and the C shorter and narrower, length less than 0.45 length tegulum (Griswold 1987c, figs. 29, 30, 35); female unknown.

DESCRIPTION. — See Griswold (1987c:508–510).

NATURAL HISTORY. — Label data read "malaise trough, veld," suggesting that the type was collected in montane grassland (Fig. 3D).

DISTRIBUTION. — Known only from the type locality in the Drakensberg Mountains of South Africa (Fig. 158).

MATERIAL EXAMINED. — SOUTH AFRICA: **Kwazulu-Natal**: Cathedral Peak Forest Station, 75 km WSW Estcourt, elev. 1860 m, 21–31 December 1979, S. and J. Peck (holotype ♂ NMSA).

Ilisoa Griswold, 1987

Ilisoa Griswold, 1987c:517 (type species, by original designation, *I. knysna* Griswold 1987c, from the Cape region of South Africa). Platnick 1989:182.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Ilisoa* synapomorphies are the unique forms of the vulval AD (50:1) and epigynum (58:1); the coarse, long and stout abdominal setae (24:1) and epigynal scape that extends to the posterior margin of MH (54:1) are synapomorphies uniting *Ilisoa* with the South African genus *Pokennips*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Cyatholipus*, *Hanea*, *Lordhowea*, *Matilda*, *Pokennips*, and *Umwani* by having the abdomen nearly round when viewed laterally (Figs. 71A–C, 74A–C), from *Buibui* and *Matilda* in lacking sclerotizations meeting around the coxae (Figs. 71A, 74A), and from *Hanea*, *Lordhowea*, and *Umwani* by having coarse setae on the abdomen (Griswold 1987c, figs. 58, 61). Males are distinguished from *Cyatholipus* and *Pokennips* by lacking the PEP (Fig. 73A, C, E, F); females are distinguished from *Cyatholipus* in having the vulva with large hyaline AD (Fig. 75A–D), and from *Pokennips* by the characteristic epigynum, with atrial furrows extending narrowly behind broad S (Fig. 73B, D).

DESCRIPTION. — Total length 2.18–2.25. Carapace oval in dorsal view (Figs. 71C, 74C), length 1.34–1.56 times width, evenly curved in profile (Figs. 71A, 74A), maximum height 0.45–0.60 times width; texture granulate, carapace posterior margin truncate to weakly concave, with weak carina; thoracic fovea oval; ocular area with PER width 2.10–2.65 times OAL, 2.50–3.00 times OQP, OQP about equal to OQA; diameter AME 1.00–1.50 times PME, distance PME–PLE 1.30–2.15 times PME diameter; clypeal height 2.44–3.50 times AME diameter, cheliceral length 1.57–1.91 times clypeal height; chelicerae unmodified, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum pustulate with setal bases on raised mounds (Figs. 71B, 74B), short, length 0.84–1.06 times width, coxae surrounded by unsclerotized cuticle (though sclerotized sternal and pleural points may nearly meet). Abdomen round (Fig. 71A), unsclerotized or sclerotized around pedicel; abdominal setae long, coarse (Griswold 1987c, figs. 58, 61); spinnerets typical. Legs with femur I 1.30–2.16 times carapace width, unmodified (Figs. 71A, 74A), leg formula 1243 or 123=4. Male palpus (Figs. 72A–C; 73E, F) with cymbial RMP variable, palpal bulb with dentate MLT, apex smooth; C smooth, median, longitudinal, simple; E thick, long, length greater than 1.1 rotation, base smooth, simple, origin apical at near 1 o'clock; PEP absent; reservoir with curlicue near embolic base. Epigynum (Fig. 73B, D) with S and MH, septum between CO broad, atrial furrows extend narrowly to nearly meet behind S; S broad, fused with MH; ML parallel-sided. Vulva (Fig. 75A–D) with extensive hyaline AD, extending anteriad, making one short lateral loop, then straight posteriad to join HS; FD posterior.

COMPOSITION. — Three species.

NATURAL HISTORY. — See under each species below.

DISTRIBUTION. — Western Cape region of South Africa (Fig. 159).

Ilisoa conjugalis, new species
Figures 3F; 71A–C; 72A–C; 73A, C, D; 75A–C; 159

TYPE. — Male holotype from Buffels Bay, Cape Peninsula, South Africa, collected 12 August 1978 by A. Russell-Smith, deposited in CASC.

ETYMOLOGY. — Latin, of marriage.

DIAGNOSIS. — Distinguished from other *Ilisoa* by having the male with cymbial RMP small, pointed and directed ventrad (Figs. 72A, 73C), and the apex of tegulum an evenly convex, small lobe apical of C (Figs. 72B, 73A), and by having the female with lateral bands surrounding the spinnerets (Fig. 71B) and the epigynum as in Fig. 73B.

MALE (holotype). — Total length 2.02. Carapace, chelicerae, pedipalpal coxae, labium and sternum orange-brown, unmarked except carapace dusky along lateral margin; ocular area with black surrounding each eye, and with diffuse dark area between AME and extending back nearly to PER; coxae, trochanters, legs, and pedipalpi white, unmarked, cymbium yellow-brown; abdomen white, with pair of anteromedian dark longitudinal lines and dorsomedian spots, sides with longitudinal band and posterior spot, venter gray (Fig. 71A–C). Carapace 1.04 long, 0.68 wide, 0.40 high; PER 0.42 wide, AER 0.41 wide, OAL 0.20; ratio AME:ALE:PME:PLE, 1.30:1.30:1.00:1.40, PME diameter 0.05. Clypeus 0.22 high, chelicerae 0.35 long. Sternum 0.53 long, 0.49 wide; labium 0.10 long, 0.17 wide; pedipalpal coxae 0.19 long, 0.14 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.47 + 0.25 + 1.49 + 1.30 + 0.72 = [5.23]; II: 1.06 + 0.23 + 1.06 + 0.85 + 0.59 = [3.79]; III: 0.66 + 0.21 + 0.49 + 0.47 + 0.38 = [2.21]; IV: 0.91 + 0.19 + 0.68 + 0.59 + 0.42 = [2.79]; pedipalpus: 0.29 + 0.13 + 0.10 + (absent) + 0.38 = [0.90]. Abdomen unsclerotized. Palp with cymbial RMP narrow, pointed, directed ventrad (Figs. 72A, 73A); tegulum apex smooth, evenly convex, with small lobe apicad of C (Figs. 72B, C; 73A, C).

VARIATION (N = 2). — Total length 1.83–2.02; ratios of carapace length/width 1.41–1.52, height/width 0.58–0.60; ratios of PER/OQP 2.67–3.07, PER/OAL 2.10–2.55, OQP/OQA 0.92–0.95, diameter AME/PME 1.17–1.30; ratios of clypeal height/diameter AME 2.71–3.23, cheliceral length/clypeal height 1.57–1.84; ratio of length femur I/carapace width 2.12–2.16; cephalothorax orange-brown to red-brown, abdomen dorsal marks broken into spots or forming continuous band; sclerotized points between coxae well separated to nearly meeting.

FEMALE (Kalk Bay). — Total length 2.19. Markings and structure as in male except coarse abdominal setae not apparent. Carapace 1.07 long, 0.80 wide, 0.40 high; PER 0.51 wide, AER 0.49 wide, OAL 0.20; ratio AME:ALE:PME:PLE, 1.08:1.00:1.08:1.15, PME diameter 0.07. Clypeus 0.23 high, chelicerae 0.44 long. Sternum 0.55 long, 0.58 wide; labium 0.13 long, 0.19 wide; pedipalpal coxae 0.19 long, 0.15 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.29 + 0.28 + 1.19 + 0.96 + 0.64 = [4.36]; II: 1.06 + 0.25 + 0.98 + 0.79 + 0.53 = [3.55]; III: 0.70 + 0.21 + 0.53 + 0.51 + 0.38 = [2.65]; IV: 0.96 + 0.25 + 0.70 + 0.62 + 0.42 = [2.65]; pedipalpus: 0.30 + 0.10 + 0.17 + (absent) + 0.39 = [0.96]. Epigynum as in Fig. 73D; vulva as in Fig. 75A–C.

NATURAL HISTORY. — Label data indicate that specimens were collected in sand dunes (Fig. 3F).

DISTRIBUTION. — Known only from the Cape Peninsula in South Africa (Fig. 159).

ADDITIONAL MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Buffels Bay, Cape Peninsula, 12 August 1978, A. Russell-Smith (2♂ CASC); Kalk Bay (1♀ SAM).

Ilisoa hawequas Griswold, 1987
Figures 73B; 75D; 159

I. hawequas Griswold 1987c:520 (holotype ♀ from Hawequas, South Africa, TMSA #15513, examined). Platnick 1989:182.

DIAGNOSIS. — Females are distinguished from other *Ilisoa* by having the abdominal markings surrounding spinnerets broken into a series of spots and the epigynum as in Fig. 73B and vulva as in Fig. 75D; male unknown.

DESCRIPTION. — See Griswold (1987c:520–521) for female.

NATURAL HISTORY. — The lone specimen was collected by sifting humus, suggesting that this species lives in leaf litter.

DISTRIBUTION. — Known only from the type locality.

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Hawequas, 5 November 1973, S. Endrödy-Younga (holotype ♀ TMSA).

Ilisoa knysna Griswold, 1987
Figures 3C; 73E, F; 74A–C; 159

I. knysna Griswold 1987c:518 (holotype ♂ from Knysna Forest, South Africa, NMSA type #3382, examined). Platnick 1989:182.

DIAGNOSIS. — Males are distinguished from other *Ilisoa* by having the cymbial RMP large, directed distad (Fig. 73E; Griswold 1987c, fig. 66) and the apex of the tegulum lobate (Fig. 73F); female unknown.

DESCRIPTION. — See Griswold (1987c:518–519) for male.

NATURAL HISTORY. — The lone specimen was collected in wet forest (Fig. 3C).

DISTRIBUTION. — Known only from the type locality (Fig. 159).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Diepwalle Forest Station, Knysna Forest, 11–13 November 1985, C. E. Griswold (holotype ♂ NMSA).

Isicabu Griswold, 1987

Isicabu Griswold 1987c:522 (type species, by original designation, *I. reavelli* Griswold 1987, from Zululand, South Africa). Platnick 1989:182.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Isicabu* synapomorphies are the carapace posterior margin deeply concave and flared at sides (10:1) and protuberance at the base of male chelicera (16:1); the low, indented male carapace profile (7:0) and male carapace that is diamond shaped in dorsal view (9:1) are synapomorphies uniting *Isicabu* as sister group to the African *Scharffia* plus Malagasy *Alaranea*.

EXCLUDED SPECIES. — *Isicabu capensis* Griswold, 1987 does not have the synapomorphies of *Isicabu*, and is therefore excluded from the genus. It is the type species of the new genus *Ubacisi*.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Tekelloides*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Figs. 76, 86A), from *Buibui*, *Kubwa*, *Pembatatu*, *Tekellatus*, *Teemenaarus*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the carapace usually low (Figs. 76, 80), diamond shaped in dorsal view (Figs. 77A, 86B), posterior margin concave, thickened ectally (Figs. 4B; 77B, D; 86B), and from *Alaranea* and *Scharffia* by lacking an annulate petiole on the abdomen (Figs. 4B, 76); males are distinguished from all these genera except *Tekelloides* and *Vazaha* by having the chelicerae with a basal protuberance (Figs. 76, 80, 83, 86).

DESCRIPTION. — Total length 2.16–3.83. Carapace diamond-shaped in dorsal view (Figs. 77A, 86B), narrowed posteriorly, length 1.56–1.85 times width, in most specimens low (Figs. 76, 80), maximum height 0.43–0.63 times width; texture finely rugose to granulate, carapace posterior margin weakly to deeply concave, with ectal swellings (Figs. 4B; 77B, D; 86B); thoracic fovea oval to triangular, shallow in female and deeper in male; ocular area with PER width 2.10–2.87 times OAL, 2.30–2.80 times OQP, OQP 0.89–1.06 times OQA; diameter AME 0.95–1.60 times PME, distance PME–PLE 0.95–1.80 times PME diameter; clypeal height 1.60–2.40 times AME diameter, cheliceral length 2.00–2.70 times clypeal height; chelicerae with basal projection (Figs. 76, 80, 83, 86), especially large in males, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum rugose (Fig. 4F), length 1.09–1.30 times width, coxae may or may not be surrounded by sclerotized cuticle. Abdomen triangular (Figs. 76, 86A), unsclerotized or sclerotized around pedicel, not or weakly petiolate; abdominal setae short, slender, bases of anterior setae slightly enlarged; spinnerets typical. Legs of most species short, femur I 0.96–3.90 times carapace width, may (Figs. 7F, 80) or may not (Figs. 76, 83) be modified; leg formula 1243. Male palpus with cymbial RMP pointing ventrad, smaller than the PC (Fig. 13A); palpal bulb with MLT with transversely oval denticulate patch, in most species with a transverse ridge ending distally in a low point (Figs. 13C, 79A), apex a large, pustulate lobe (Fig. 79G, I); C median, longitudinal, bipartite; E thick, long, length less than 1.1 rotation, base simple, origin apical at near 1–2 o'clock; PEP present, thick and fleshy (Figs. 78D, 81D); reservoir with curlicue near embolic base. Epigynum with S and MH (Figs. 79B, E; 82A–C), septum between CO slender, atrial furrows extend only to S; ML parallel-sided. Vulva (Fig. 85A–G) AD sclerotized, hemispherical or oval, size ranging from equal to to twice as large as HS; FD posterior.

COMPOSITION. — Five species.

NATURAL HISTORY. — See under each species below.

DISTRIBUTION. — Africa from Natal to Tanzania (Fig. 153).

Isicabu henriki, new species

Figures 76; 78A–D; 79A–C; 85B, D, F; 153

TYPES. — Male holotype from an elevation of 1850 m in Mwanihana Forest above Sanje, Uzungwa Mts., Tanzania, collected 18 August 1982 by M. Stoltze and N. Scharff, deposited in ZMUC. Paratype ♀, 1800 m, 18 August 1982, M. Stoltze and N. Scharff, in ZMUC.

ETYMOLOGY. — Named after Prince Henrik of Denmark, who supported the expeditions that collected the specimens.

DIAGNOSIS. — Distinguished from *I. reavelli* and *I. zuluensis* by having the coxae surrounded by sclerotized bands and male patellae I and II enlarged (Fig. 76), from *I. margrethae* by having femur I length < 2.50 times carapace width and the abdominal apex lacking a sclerotized cap, and from *I. kombo* by having the male metatarsi I straight and the vulval AD larger than the HS (Fig. 85D).

MALE (holotype). — Total length 3.15. Carapace and chelicerae red-brown, dusky along lateral margins of carapace and pars cephalica, and forming forward-pointing narrow triangle on and radial lines extending laterad from thoracic fovea (Fig. 77A); pedipalpal coxae and sternum dark red-brown to nearly black; coxae, trochanters, basal segments of pedipalpi and bases of femora white, cymbium red-brown, distal 2/3 of leg femora with dark longitudinal bands, patellae-tarsi yellow-brown; abdomen white, dorsum black for anterior 3/4, with short median white longitudinal bands anteriorly and in middle, transverse dark band posteriorly, venter dark gray, book lung covers white, sclerotization from epigastric furrow to and around pedicel, sclerotization nearly meeting dorsad of pedicel (Fig. 76). Carapace 1.60 long, 0.96 wide, 0.49 high, posterior margin deeply concave, thoracic fovea shallow, triangular; PER 0.50 wide, AER 0.47 wide, OAL 0.21; ratio AME:ALE:PME:PLE, 1.23:1.00:1.08:1.15, PME diameter 0.07. Clypeus 0.22 high, chelicerae 0.51 long, with large pointed protuberance near base. Sternum 0.86 long, 0.66 wide; labium 0.20 long, 0.23 wide; pedipalpal coxae 0.31 long, 0.17 wide; sclerotized bands extend between and surround leg coxae. Legs setose, patellae I and II enlarged. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.13 + 0.42 + 2.02 + 1.87 + 1.02 = [7.46]; II: 1.89 + 0.40 + 1.70 + 1.57 + 0.85 = [6.41]; III: 1.17 + 0.30 + 0.85 + 0.85 + 0.49 = [3.66]; IV: 1.49 + 0.32 + 1.17 + 1.13 + 0.57 = [4.68]; pedipalpus: 0.48 + 0.15 + 0.14 + (absent) + 0.34 = [1.11]. Palpus (Figs. 78A–D; 79A, C) with cymbial RMP apex rounded, PC a short hook in lateral view; C with teeth along lower inner margin, PEP nearly smooth, with scattered small pustules (Fig. 78D).

VARIATION (N = 3). — Total length 2.85–2.15; ratios of carapace length/width 1.67–1.74, height/width 0.45–0.52; ratios of PER/OQP 2.40–2.82, PER/OAL 2.25–2.40, OQP/OQA 0.89–1.05, diameter AME/PME 1.14–1.23; ratios of clypeal height/diameter AME 2.25–2.47, cheliceral length/clypeal height 2.21–2.50; ratio of length femur I/carapace width 2.15–2.35. Markings of carapace uniform dark red-brown to orange-brown centrally shading to nearly black at sides; relative extent of light and dark abdominal markings varies.

FEMALE (paratype). — Total length 2.89. Markings and structure as in male except carapace dark red-brown, unmarked, legs uniformly orange-brown, and black mark on dorsum of abdomen encompassing anteromedian longitudinal band and three lateral white spots. Carapace 1.24 long, 0.71 wide, 0.43 high; PER 0.45 wide, AER 0.44 wide, OAL 0.20; ratio AME:ALE:PME:PLE, 1.42:1.17:1.00:1.33, PME diameter 0.06. Clypeus 0.19 high, chelicerae 0.38 long, basal protuberance smaller than in male. Sternum 0.61 long, 0.54 wide; labium 0.16 long, 0.21 wide; pedipalpal coxae 0.20 long, 0.13 wide. Legs unmodified, setose. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.76 + 0.28 + 1.49 + 1.23 + 0.68 = [5.44]; II: 1.40 + 0.25 + 1.28 + 1.00 + 0.62 = [4.44]; III: 0.79 + 0.21 + 0.62 + 0.55 + 0.38 = [2.55]; IV: 1.13 + 0.25 + 0.94 + 0.70 + 0.42 = [3.41]; pedipalpus: 0.26 + 0.08 + 0.16 + (absent) + 0.33 = [0.83]. Abdomen weakly sclerotized around spinnerets and sclerotized from epigastric furrow to and around pedicel. Epigynum as in Fig. 79B; vulva as in Fig. 85B, D, F.

VARIATION (N = 3). — Total length 2.55–2.89; ratios of carapace length/width 1.73–1.77, height/width 0.52–0.60; ratios of PER/OQP 2.39–2.79, PER/OAL 2.26–2.56, OQP/OQA 0.94–1.12, diameter AME/PME 1.40–1.42; ratios of clypeal height/diameter AME 1.88–2.14, cheliceral length/clypeal height 2.00–2.67; ratio of length femur I/carapace width 2.44–3.29. The relative size and intensity of light and dark markings on the abdomen vary: the dorsum of the abdomen may be solid black on anterior two-thirds, or have only a faint trace of dark marks amidst the reticulate guanine deposits.

NATURAL HISTORY. — Specimens have been collected in litter, by sweeping forest understory vegetation, and by canopy fogging, suggesting an extensive vertical distribution in forests.

DISTRIBUTION. — Known only from the Uzungwa Mountains in southwestern Tanzania (Fig. 153).

ADDITIONAL MATERIAL EXAMINED. — TANZANIA: **Morogoro**: Mwanihana Forest above Sanje, Uzungwa Mts., Chita Forest above Chita Village, 1500 m, 9 November 1984, 1600 m, N. Scharff (1♀ ZMUC), 8 November 1984, N. Scharff (1♀ ZMUC); **Iringa**: Uzungwa Scarp Forest Reserve, 11 km SE of Masisiwe village, Kihanga Stream, 8°22′5.7″S, 35°58′41.6″ E, elev. 1800 m (3♂ ZMUC), 8°22′17.2″S, 35°58′ 43.0″ E, elev. 1920 m, 17–27 June 1997, ZMUC-USNM expedition (1♂4♀ ZMUC, 1♂2♀ CASC).

Isicabu kombo, new species
Figures 4B, F; 7F; 77B; 79D–F; 80; 81A–D; 82A–C; 85A, C, E; 153

TYPES. — Male holotype and female paratype from an elevation of 1800 m at Mazumbai, West Usambara Mts., Muheza District, Tanga region, Tanzania, collected 12 November 1995 by C. Griswold, deposited in CASC.

ETYMOLOGY. — Swahili *kombo*, crooked or bent.

DIAGNOSIS. — Distinguished from *I. reavelli* and *I. zuluensis* by having the coxae surrounded by sclerotized bands and male patellae I and II enlarged (Fig. 80); males are distinguished from other *Isicabu* by having metatarsi I and II sinuate (Figs. 7F, 80); females are distinguished from *I. margrethae* and *I. henriki* in having the vulval AD no larger than HS (Fig. 85A, C, E) and the abdomen not petiolate (Fig. 77B, C).

MALE (holotype). — Total length 3.15. Carapace dusky yellow-brown to brown along lateral margin, orange-brown forming three lateral and one posterior diffuse radial bands extending from thoracic fovea; ocular area with dark gray surrounding AME and extending posteriad to PER and to lateral eyes; clypeus dark in center from AME to cheliceral margin; chelicerae and pedipalpal coxae dark red-brown; labium and sternum nearly black; coxae, trochanters, and legs yellow-white, pedipalpi yellow-gray, dark annuli at joints of femur-patella and tibia-metatarsus I–IV; abdomen white with bright guanine deposits showing through cuticle, extensively marked with black, black mark on dorsum of abdomen encompassing anteromedian longitudinal band and three lateral white spots, venter dark gray (Fig. 80). Carapace 1.33 long, 0.81 wide, 0.38 high, posterior margin deeply concave, thoracic fovea a shallow anteriad-pointing narrow triangle; PER and AER 0.48 wide, OAL 0.21; ratio AME:ALE:PME:PLE, 1.36:1.00:1.14:1.28, PME diameter 0.08. Clypeus 0.20 high, chelicerae 0.43 long, with large, acute basal protuberance. Sternum 0.74 long, 0.60 wide; labium 0.17 long, 0.20 wide; pedipalpal coxae 0.23 long, 0.11 wide; sclerotized bands extend between and surround leg coxae. Legs setose with patellae I and II enlarged, metatarsi I and II sinuate (Figs. 7F, 80). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.66 + 0.36 + 1.19 + 1.34 + 0.85 = [5.40]; II: 1.49 + 0.34 + 1.13 + 1.17 + 0.76 = [4.89]; III: 1.00 + 0.25 + 0.66 + 0.66 + 0.47 = [3.04]; IV: 1.25 + 0.28 + 0.87 + 0.85 + 0.51 = [3.76]; pedipalpus: 0.38 + 0.15 + 0.15 + (absent) + 0.37 = [1.05]. Abdomen with sclerotization from epigastric furrow to and around pedicel, not petiolate. Palp with cymbial RMP blunt (Fig. 81A), PC evenly curved in lateral view; tegulum apex raised, pustulate, MLT with longitudinal ridge, denticulate patch narrow (Figs. 79D, F; 81B, C); PEP with a few pustules (Fig. 81D).

VARIATION (N = 4). — Total length 2.59–3.23; ratios of carapace length/width 1.64–1.80, height/width 0.46–0.52; ratios of PER/OQP 2.19–2.65, PER/OAL 2.28–2.65, OQP/OQA 0.89–1.06, diameter AME/PME 1.17–1.50; ratios of clypeal height/diameter AME 1.60–2.37, cheliceral length/clypeal height 1.95–2.33; ratio of length femur I/carapace width 0.96–1.24. Carapace dusky red-brown to light orange-brown, with or without dark markings radiating from thoracic fovea; legs may or may not have dark annuli at joints of femur-patella and tibia-metatarsus I–IV; relative size and intensity of light and dark markings on the carapace and abdomen vary, with some individuals having the abdominal dorsum entirely black from mid-anterior to posterior tip.

FEMALE (paratype). — Total length 3.23. Markings and structure as in male (Fig. 77B, C) except metatarsi I and II straight. Carapace 1.26 long, 0.76 wide, 0.37 high; PER 0.45 wide, AER 0.53 wide, OAL 0.21; ratio AME:ALE:PME:PLE, 1.21:1.14:1.00:1.14, PME diameter 0.07. Clypeus 0.16 high, chelicerae 0.38 long. Sternum 0.67 long, 0.58 wide; labium 0.16 long, 0.19 wide; pedipalpal coxae 0.22 long, 0.13 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.45 + 0.32 + 1.08 + 1.17 + 0.68 = [4.70]; II: 1.32 + 0.28 + 1.04 + 1.04 + 0.62 = [4.30]; III: 0.89 + 0.25 + 0.55 + 0.57 + 0.42 = [2.68]; IV: 1.11 + 0.23 + 0.83 + 0.76 + 0.51 = [3.44]; pedipalpus: 0.33 + 0.11 + 0.19 + (absent) + 0.37 = [1.00]. Epigynum as in Figs. 79E, 82A–C; vulva as in Fig. 85A, C, E.

VARIATION (N = 4). — Total length 2.89–3.83; ratios of carapace length/width 1.64–1.85, height/width 0.46–0.58; ratios of PER/OQP 2.39–2.47, PER/OAL 2.39–2.87, OQP/OQA 0.90–1.06, diameter AME/PME 1.17–1.60; ratios of clypeal height/diameter AME 1.75–2.12, cheliceral length/clypeal height 2.40–2.70; ratio of length femur I/carapace width 1.89–2.02. The relative size and intensity of light and dark markings on the carapace and abdomen vary.

NATURAL HISTORY. — Spiders were collected in the understory of both dense and open montane rainforest. They were found hanging beneath sheet webs or extracted by beating vegetation between 1 and 3 m above the ground.

DISTRIBUTION. — Usambara Mountains, Tanzania (Fig. 153).

ADDITIONAL MATERIAL EXAMINED. — TANZANIA: **Tanga**: East Usambara Mts.: Amani, Mbomole Hill, 5°5.7′S, 38°37′E, elev. 1000 m, 5–8 November 1995, C. Griswold, D. Ubick, and N. Scharff (5♂8♀ CASC, 5♂7♀ ZMUC), Sangarawe Forest, 5°6.5′S, 38°35.7′E, elev. 990 m, 5–6 November 1995, C. Griswold (1♂ CASC), Amani, 5°5.7′S, 38°38′E, elev. 950 m, 1 November 1995, C. Griswold (1♂ CASC); West Usambara Mts., Mazumbai, elev. 1600 m, 1 August 1980, M. Stoltze and N. Scharff (1♂ ZMUC), Mazumbai, elev. 1600–1800 m, 4°49′S, 38°30′E, 11–20 November 1995, C. Griswold, D. Ubick, and N. Scharff (3♂2♀ CASC, 5♂2♀ ZMUC).

Isicabu margrethae, new species

Figures 77D; 83; 84A–D; 85G; 153

TYPES — Male holotype and female paratype from Tanzania, Iringa District, Uzungwa Scarp Forest Reserve, 11 km SE of Masisiwe village, Kihanga Stream, 8°22′5.7″S, 35°58′41.6″ E, elev. 1800 m, canopy fogging, 17–27 June 1997, collected by ZMUC-USNM expedition, deposited in ZMUC.

ETYMOLOGY. — This elegant spider is named after Queen Margrethe of Denmark, who supported the expeditions that collected the specimens.

DIAGNOSIS. — Distinguished from other *Isicabu* by having femur I length > 2.50 times carapace width (Fig. 83) and the abdomen weakly petiolate and with a sclerotized cap on the apex (Fig. 77D); the male PEP is uniquely covered with elongate digitate processes (Fig. 84D).

MALE (holotype). — Total length 2.76. Carapace (Fig. 83) orange-brown, dusky along lateral and posterior margin and along thoracic fovea anteriad onto pars cephalica, ocular area with black surrounding each eye and extending between AME, lateral eyes, and AME and PME; clypeus orange-brown, black between AME and cheliceral margin; chelicerae dusky orange-brown; pedipalpal coxae, labium and sternum dark red-brown; coxae and trochanters yellow-white; legs dusky yellow-brown except paler at bases of femora, otherwise unmarked; abdomen pale grey, dorsum with dark grey outlining anteromedian straight and lateral curved light bands, 3 median spots, a posteromedian cross, and a small posterior light spot, sides with faint longitudinal grey band, venter dark grey between epigastric furrow and spinnerets; brown sclerotization surrounding spinnerets and from epigastric furrow to and surrounding pedicel to form petiole, tip of abdomen with translucent sclerotization. Carapace 1.25 long, 0.72 wide, 0.38 high; PER 0.45 wide, AER 0.44 wide, OAL 0.18; ratio AME:ALE:PME:PLE, 1.80:1.30:1.00:1.80, PME diameter 0.05. Clypeus 0.18 high, chelicerae 0.40 long, with large, broad, basal protuberance. Sternum 0.63 long, 0.54 wide; labium 0.16 long, 0.19 wide; pedipalpal coxae 0.23 long, 0.13 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.38 + 0.28 + 2.18 + 1.74 + 0.87 = [7.45]; II: 2.08 + 0.28 + 1.99 + 1.57 + 0.85 = [6.77]; III: 0.89 + 0.28 + 0.74 + 0.68 + 0.45 = [3.04]; IV: 1.30 + 0.23 + 1.06 + 0.85 + 0.51 = [3.95]; pedipalpus: 0.36 + 0.15 + 0.10 + (absent) + 0.34 = [0.95]. Palp with cymbial RMP bluntly bifid (Fig. 84A), PC short in lateral view; tegulum (Fig. 84B, C) apex a low lobe, MLT with longitudinal ridge, denticulate area extending only one-half length of lobe; inner margin of C with fimbriate ridge; PEP covered with elongate, digitate processes (Fig. 84D).

VARIATION (N = 3). — Total length 2.76–3.15; ratios of carapace length/width 1.72–1.76, height/width 0.50–0.55; ratios of PER/OQP 2.53–2.76, PER/OAL 2.24–2.53, OQP/OQA 0.85–1.06, diameter AME/PME 1.43–1.80; ratios of clypeal height/diameter AME 1.80–2.22, cheliceral length/clypeal height 2.23–2.61; ratio of length femur I/carapace width 3.24–3.89. Carapace markings uniform dark orange-brown to red-brown, or orange-brown in center shading to nearly black along margin; relative size of light and dark markings of abdomen varies.

FEMALE (paratype). — Total length 2.89. Markings and structure (Fig. 77D) as in male except white markings of abdomen more extensive and sclerotization around spinnerets weaker. Carapace 1.21 long, 0.68 wide, 0.37 high; PER 0.45 wide, AER 0.44 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.33:1.17:1.00:1.17, PME diameter 0.06. Clypeus 0.17 high, chelicerae 0.39 long. Sternum 0.63 long, 0.55 wide; labium 0.13 long, 0.21 wide; pedipalpal coxae 0.22 long, 0.13 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.04 + 0.30 + 1.83 + 1.42 + 0.81 = [6.40]; II: 1.72 + 0.28 + 1.64 + 1.25 + 0.76 = [5.65]; III: 0.81 + 0.23 + 0.68 + 0.64 + 0.36 = [2.72]; IV: 1.32 + 0.25 + 1.06 + 0.81 + 0.49 = [3.93]; pedipalpus: 0.34 + 0.10 + 0.18 + (absent) + 0.37 = [0.99]. Epigynum as in *I. kombo*; vulva as in Fig. 85G, AD larger than HS.

VARIATION (N = 3). — Total length 2.89–3.08; ratios of carapace length/width 1.70–1.77, height/width 0.46–0.57; ratios of PER/OQP 2.39–2.69, PER/OAL 2.26–2.69, OQP/OQA 0.89–1.06, diameter AME/PME 1.33–1.80; ratios of clypeal height/diameter AME 1.67–2.00, cheliceral length/clypeal height 2.31–2.60; ratio of length femur I/carapace width 2.65–2.95. Carapace markings uniform dark orange-brown to red-brown, or orange-brown in center shading to nearly black along margin; relative size of light and dark markings of abdomen varies, especially extent of dorsal markings, which may surround several median spots (Fig. 77D) or be faint.

NATURAL HISTORY. — *Isicabu margrethae* was collected by fogging of rain forest canopy.

DISTRIBUTION. — Known only from the Uzungwa Mountains, Tanzania (Fig. 153).

ADDITIONAL MATERIAL EXAMINED. — TANZANIA: **Iringa**: Uzungwa Scarp Forest Reserve, 11 km SE of Masisiwe village, Kihanga Stream, 8°22′5.7″S, 35°58′41.6″ E, elev. 1800 m (1♂13♀ ZMUC), 8°22′17.2″S, 35°58′43.0″ E, elev. 1920 m, 17–27 June 1997, ZMUC-USNM expedition (1♂2♀ CASC, 1♀ ZMUC).

Isicabu reavelli Griswold, 1987
Figures 79G, H, I; 86A–C; 153

I. reavelli Griswold 1987c:523 (holotype ♂ from Nkandla Forest, South Africa, NMSA type #3383, examined). Platnick 1989:182.

DIAGNOSIS. — Distinguished from other *Isicabu* except *I. zuluensis* by having the coxae surrounded by unsclerotized cuticle and male with patellae I and II not noticeably enlarged, diameter slightly greater than base of tibiae (Fig. 86A); distinguished from males of *I. zuluensis* by having the femora and patellae with dark lateral bands; females are further distinguished from *I. margrethae* and *I. henriki* by having the vulval afferent ducts hemispherical as in *I. kombo* (Fig. 85C), about equal to HS, and from *I. kombo* by having the abdomen not sclerotized around pedicel (Fig. 86B, C).

DESCRIPTION. — See Griswold (1987c:523–525).

NATURAL HISTORY. — The type series was collected by sweeping shrubs in forest.

DISTRIBUTION. — Known only from the type locality in montane forest (Fig. 153).

MATERIAL EXAMINED. — SOUTH AFRICA: **Kwazulu-Natal**: Nkandla Forest, Zululand, 20 September 1983, P. Reavell (holotype ♂, 2♀ paratypes NMSA).

Isicabu zuluensis Griswold, 1987
Figure 153

I. zuluensis Griswold 1987c:525 (holotype ♂ from Dukuduku Forest, Zululand, South Africa, NMSA type #3384, examined). Platnick 1989:182.

DIAGNOSIS. — Distinguished from males of other *Isicabu* except *I. reavelli* by having the male coxae surrounded by unsclerotized cuticle (though sclerotized points nearly meet), and patellae I and II not noticeably enlarged, diameter slightly greater than base of tibiae; distinguished from *I. reavelli* by having the legs unmarked except for faint apical annuli on tibiae (Griswold 1987c, fig. 90); female unknown.

DESCRIPTION. — See Griswold (1987c:525–528) for male.

NATURAL HISTORY. — *Isicabu zuluensis* occurs in the understory of moist forests.

DISTRIBUTION. — Moist coastal and mid-elevation montane forests of Kwazulu-Natal, South Africa.

MATERIAL EXAMINED. -- SOUTH AFRICA: **Kwazulu-Natal**: Dukuduku Forest, Zululand, 22 January 1980, P. Reavell (holotype ♂ NMSA); Town Bush forest, Pietermaritzburg, 20 September 1984, T. Meikle and C. Griswold (1♂ NMSA).

Kubwa, new genus

TYPE SPECIES. — *Kubwa singularis*, new species

ETYMOLOGY. — Swahili, great; gender feminine.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Kubwa* autapomorphies are the male metatarsus I that is sinuate (5:1) and swollen (6:1), tubular vulval AD (45:0), and uniquely enlarged palpal bulb and cymbium. The embolus origin at the apex of the tegulum at or before 12 o'clock (35:3) suggests that this genus may be the sister group of a large suite of genera occurring in southern and tropical Africa, Madagascar and New Zealand: *Umwani*, *Pembatatu*, *Ilisoa*, *Pokennips*, *Ulwembua*, *Tekella*, *Tekelloides* and *Hanea*.

DIAGNOSIS. — Distinguished from all other Cyatholipidae by having the apex of cymbium pointed (Figs. 88B; 89A, B), the PEP very large, the epigynum (Fig. 89C) with the atrium huge and vulval AD short, narrow and nearly straight (Fig. 91B).

DESCRIPTION. — See under species description below; spinnerets typical.

COMPOSITION. — One species.

NATURAL HISTORY. — See under species below.

DISTRIBUTION. — Mt. Kilimanjaro, Tanzania.

Kubwa singularis, new species

Figures 14A, 87A–C, 88A–D, 89A–C, 152

TYPES. — Male holotype from Tanzania, Mt. Kilimanjaro at Bismark Hut, elev. 2480 m, 13 March 1969, Å. Holm, deposited in ZMUU. Paratypes, 1 male and 7 females, Mt. Kilimanjaro at Bismark Hut, elev. 2750 m, 15 March 1969, Å. Holm, 1 male, 1 female in CASC, remainder in ZMUU.

ETYMOLOGY. — Latin, alone.

DIAGNOSIS. — Distinguished by the characters of the genus.

MALE (holotype). — Total length 2.24. Carapace, clypeus, chelicerae, pedipalpal coxae, labium and sternum red-brown (Fig. 87A), black surrounding AME, PME, and lateral eyes and extending faintly between AME and PME, faintly mottled with black on pars thoracica, clypeus dusky near lower margin; coxae and trochanters yellow-white, legs dusky yellow-brown, middle of femora and patellae and bases of tibiae and metatarsi yellow-white, pedipalpi yellow-white except apex of tibia and cymbium dark grey; abdomen dark grey, with anterodorsal median and lateral longitudinal yellow-white bands and posterodorsal transverse yellow-white chevrons, venter brown between pedicel and epigastric furrow. Carapace 1.06 long, 0.78 wide, 0.44 high, rugose, oval in dorsal view, profile evenly curved, truncate posteriorly, thoracic fovea a small, deep, oval pit; PER 0.40 wide, AER 0.39 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.33:1.22:1.00:1.22, PME diameter 0.05. Clypeus 0.25 high, chelicerae 0.39 long, base convex, promargin with 4 teeth, retromargin with three. Sternum 0.55 long and wide, rugose; labium 0.15 long, 0.20 wide; pedipalpal coxae 0.23 long, 0.14 wide; coxae surrounded by unsclerotized cuticle. Legs unmodifed except metatarsi I slightly swollen and weakly bowed or sinuate; measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.15 + 0.25 + 0.87 + 0.87 + 0.62 = [3.76]; II: 1.02 + 0.23 + 0.85 + 0.76 + 0.57 = [3.43]; III: 0.76 + 0.23 + 0.55 + 0.51 + 0.45 = [2.50]; IV: 0.94 + 0.23 + 0.70 + 0.62 + 0.42 = [2.91]; pedipalpus: 0.49 + 0.21 + 0.14 + (absent) + 0.60 = [1.44]. Abdomen trapezoidal (Fig. 87A), posteriorly blunt, sclerotized only ventrally between pedicel and epigastric furrow, with fine setae only. Palp with cymbial RMP blunt (Fig. 88A), level with apex of bulb, PC very narrow in lateral view, projecting laterally; tegulum (Figs. 88B, C; 89A, B) apex a narrow, recurved, smooth lobe, MLT large, greater than one-half width of tegulum, denticulate patch covering apex of projection; reservoir with curlicue near embolic base (Fig. 14A); C bipartite, upper process very large, inner margin fimbriate, lower process broad, curved; embolus arising at 12 o'clock, base smooth, PEP large, quadrate, lacking pustules, strongly toothed along lateral margin (Fig. 88D).

VARIATION (N = 3). — Total length 2.24–2.32; ratios of carapace length/width 1.31–1.36, height/width 0.56–0.59; ratios of PER/OQP 2.67–2.86, PER/OAL 2.37–2.67, OQP/OQA 1.07–1.08, diameter AME/PME 1.33–1.37; ratios of clypeal height/diameter AME 4.00–4.36, cheliceral length/clypeal height 1.54–1.68; ratio of length femur I/carapace width 1.42–1.46. The extent of the dorsal light markings of the abdomen varies: these may form narrow bands on a dark background or surround anterior longitudinal dark bands and posterior transverse dark spots.

FEMALE (paratype). — Total length 2.08. Markings and structure (Fig. 87B, C) as in male except metatarsus I unmodified. Carapace 0.91 long, 0.69 wide, 0.39 high; PER 0.39 wide, AER 0.37 wide, OAL 0.16; ratio AME:ALE:PME:PLE, 1.37:1.37:1.00:1.25, PME diameter 0.04. Clypeus 0.20 high, chelicerae 0.34 long. Sternum 0.46 long, 0.50 wide; labium 0.13 long, 0.20 wide; pedipalpal coxae 0.22 long, 0.16 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.04 + 0.25 + 0.79 + 0.76 + 0.59 = [3.43]; II: 0.94 + 0.23 + 0.72 + 0.64 + 0.57 = [3.10]; III: 0.66 + 0.21 + 0.51 + 0.45 + 0.38 = [2.21]; IV: 0.87 + 0.22 + 0.64 + 0.55 + 0.42 = [2.70]; pedipalpus: 0.30 + 0.11 + 0.15 + (absent) + 0.33 = [0.89]. Epigynum as in Figs. 89C, 90A–C, anterior margin of atrium confluent with S, atrium very large, MS narrow; vulva as in Fig. 91A–C, AD short, narrow and nearly straight.

VARIATION (N = 3). — Total length 2.08–2.19; ratios of carapace length/width 1.27–1.34, height/width 0.53–0.56; ratios of PER/OQP 2.65–2.85, PER/OAL 2.47–2.77, OQP/OQA 1.08–1.13, diameter AME/PME 1.37–1.67; ratios of clypeal height/diameter AME 3.09–3.60, cheliceral length/clypeal height 1.68–1.94; ratio of length femur I/carapace width 1.37–1.48. The extent of the dorsal light markings of the abdomen varies: these may form narrow bands on a dark background or surround anterior longitudinal dark bands and posterior transverse dark spots.

NATURAL HISTORY. — Label data indicate that specimens were taken from moss on a rock wall. Bismark Hut is near the upper border of subalpine forest on Mt. Kilimanjaro, with vegetation consisting of *Olea chrysophylla*, *Ilex mitis*, *Juniperus procera*, *Podocarpus milanjianus* and *Hagenia abyssinica*, all densely covered with the hanging lichen *Usnea* (Walter 1971:195–196).

DISTRIBUTION. — Known only from Mt. Kilimanjaro in Tanzania (Fig. 152).

ADDITIONAL MATERIAL EXAMINED. — TANZANIA: **Arusha**: Kilimanjaro, Bismark Hut, elev. 2600 m, 13 June 1948, Å. Holm (3♂4♀ ZMUU).

Pembatatu, new genus

TYPE SPECIES. — *Pembatatu embamba*, new species.

ETYMOLOGY. — Swahili, triangular; gender feminine.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Pembatatu* synapomorphies are the arborescent PEP (41:4) and hemispherical vulval AD that are at least twice as large as HS (46:1) and have a lateral twist (47:1). The embolus that makes more than 1.1 rotation (36:1) is a synapomorphy suggesting that this genus may be the sister group of a large suite of genera occurring in southern and tropical Africa, Madagascar and New Zealand: *Umwani*, *Ilisoa*, *Pokennips*, *Ulwembua*, *Tekella*, *Tekelloides* and *Hanea*.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Tekelloides*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Figs. 1, 92A), from *Alaranea*, *Buibui abyssinica*, *Scharffia*, *Toddiana*, and *Wanzia* in having the coxae surrounded by soft cuticle, sclerotized points not meeting (Fig. 92C), and from *Teemenaarus* in lacking coarse setae and a petiole on the abdomen (Figs. 1, 92A). Males are distinguished from *Isicabu*, *Kubwa*, *Tekellatus*, *Tekelloides*, *Ubacisi*, *Ulwembua*, and *Vazaha* in having the PEP small, with the strongly toothed base arborescent (Figs. 93D, 97D), and females from these genera by having the vulval AD sclerotized and larger than HS, hemispherical or quadrate with a lateral loop (Figs. 96A, B; 99A, C, E).

DESCRIPTION. — Total length 1.74–3.02. Carapace oval in dorsal view (Fig. 92B), length 1.34–1.55 times width, profile evenly curved (Fig. 92A), maximum height 0.45–0.60 times width; texture granulate, thoracic fovea a shallow oval; carapace posterior margin nearly truncate; ocular area with PER width 2.24–2.64 times OAL, 2.37–2.86 times OQP, OQP 0.93–1.36 times OQA; diameter AME 0.91–1.59 times PME, distance PME–PLE 1.40–2.25 times PME diameter; clypeal height 1.17–3.00 times AME diameter, cheliceral length 2.11–4.55 times clypeal height; chelicerae convex at base, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum rugose (Fig. 92C), length 1.00–1.17 times width, coxae not surrounded by sclerotized cuticle (Fig. 1). Abdomen (Fig. 92A) trapezoidal to triangular, unsclerotized or sclerotized around pedicel, not petiolate; abdominal setae fine; spinnerets typical. Leg formula 1243, with femur I 1.79–5.24 times carapace width, unmodified or with male metatarsus I swollen. Male palpus with cymbial RMP pointing ventrad (Fig. 93A), smaller than paracymbium, PC narrow in lateral view; palpal bulb with MLT small (Fig. 95C), narrower than one-half width of tegulum, with transversely oval denticulate patch, apex a low pustulate or wrinkled lobe; conductor median, longitudinal, bipartite (Fig. 95C); embolus thick with pars pedula extending for most of length, arising at 12 o'clock, length greater than 1 rotation, base smooth, PEP small, lacking pustules, strongly toothed base arborescent (Fig. 93D); reservoir with curlicue near embolic base. Epigynum (Fig. 94A–C) with scape and median hood, anterior margin of atrium confluent with S, MS broad, parallel sided; vulval AD sclerotized, hemispherical or quadrate, with lateral loop, twice as large as HS, fertilization duct posterior (Fig. 99A, C, E).

NATURAL HISTORY. — See under each species below.

COMPOSITION. — Three species.

DISTRIBUTION. — East Africa between Gregory and Albertine rifts (Fig. 151).

Pembatatu embamba, new species

Figures 1; 93A–D; 94A, B; 99A, C, E; 157

TYPES — Male holotype and female paratype from Tanzania, Ngorongoro Crater rim, elev. 2250 m, 19 March 1969, Å. Holm, deposited in ZMUU (223).

ETYMOLOGY. — Swahili, thin, referring to the slender male metatarsus I.

DIAGNOSIS. — Distinguished from other *Pembatatu* by having male leg I unmodified and the legs long, with femur I > 2.2 × carapace width (Fig. 1); there are no consistent characters to distinguish among the females of *Pembatatu*.

MALE (holotype). — Total length 1.74. Carapace orange-brown, faintly mottled with black and dusky along margin and with narrow dark stripe anteriad of thoracic fovea, black surrounding AME, PME, and lateral eyes, clypeus, chelicerae, and pedipalpal coxae orange-brown, labium and sternum dusky; coxae, trochanters and legs yellow-white, unmarked except dusky at apices of femora, patellae, tibiae, and metatarsi, pedipalpi yellow-white except cymbium and apex of tibia grey; abdomen pale grey, with longitudinal lateral dark grey bands meeting posteriorly to surround dark anterior longitudinal marks and median transverse band, venter sclerotized brown between pedicel and epigastric furrow, dark grey posteriorly (Fig. 1). Carapace 0.89 long, 0.60 wide, 0.36 high; PER 0.38 wide, AER 0.37 wide, OAL 0.16; ratio AME:ALE:PME:PLE, 1.22:1.11:1.00:1.22, PME diameter 0.05. Clypeus 0.13 high, chelicerae 0.33 long. Sternum 0.49 long, 0.45 wide; labium 0.10 long, 0.17 wide; pedipalpal coxae 0.17 long, 0.10 wide. Legs unmodified; measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.42 + 0.23 + 1.36 + 1.19 + 0.64 = [4.84]; II: 1.13 + 0.22 + 1.04 + 0.85 + 0.57 = [3.81]; III: 0.66 + 0.17 + 0.53 + 0.47 + 0.38 = [2.21]; IV: 0.91 + 0.17 + 0.74 + 0.59 + 0.40 = [2.81]; pedipalpus: 0.25 + 0.11 + 0.09 + (absent) + 0.31 = [0.76]. Abdomen triangular, only sclerotized ventrally between pedicel and epigastric furrow. Palpus (Fig. 93A–C) with cymbial RMP conical; tegulum apex weakly wrinkled, MLT denticulate patch small; C inner margin smooth, lower process slender; PEP distally blunt, strongly toothed base arborescent (Fig. 93D).

VARIATION (N = 4). — Total length 1.74–3.02; ratios of carapace length/width 1.42–1.55, height/width 0.48–0.59; ratios of PER/OQP 2.40–2.78, PER/OAL 2.40–2.54, OQP/OQA 1.07–1.32, diameter AME/PME 0.92–1.22; carapace truncate to weakly concave posteriorly; ratios of clypeal height/diameter AME 2.18–2.73, cheliceral length/clypeal height 2.00–3.00; ratio of length femur I/carapace width 2.35–5.24. Intensity and relative extent of light and dark abdominal makings vary.

FEMALE (paratype). — Total length 2.27. Markings and structure as in male except darker, carapace, mouthparts, and sternum dark red-brown, legs dusky orange-brown, abdomen with dark grey outlining white marks forming three dorsomedian triangles, the median attached to procurved lateral bands, posterior of abdomen white from spinnerets to apex. Carapace 0.91 long, 0.61 wide, 0.37 high; PER 0.41 wide, AER 0.40 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.30:1.20:1.00:1.20, PME diameter 0.05. Clypeus 0.13 high, chelicerae 0.28 long. Sternum 0.51 long, 0.47 wide; labium 0.10 long, 0.19 wide; pedipalpal coxae 0.18 long, 0.09 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.32 + 0.23 + 1.21 + 1.00 + 0.64 = [4.40]; II: 1.06 + 0.21 + 0.94 + 0.79 + 0.55 = [3.55]; III: 0.59 + 0.19 + 0.49 + 0.45 + 0.38 = [2.10]; IV: 0.87 + 0.19

+ 0.68 + 0.53 + 0.40 = [2.67]; pedipalpus: 0.22 + 0.08 + 0.13 + (absent) + 0.28 = [0.71]. Epigynum as in Fig. 94A–C, vulva as in Fig. 99A, C, E.

VARIATION (N = 5). — Total length 2.08–2.55; ratios of carapace length/width 1.44–1.53, height/width 0.52–0.60; ratios of PER/OQP 2.37–2.78, PER/OAL 2.43–2.53, OQP/OQA 0.93–1.17, diameter AME/PME 0.91–1.33; ratios of clypeal height/diameter AME 1.71–3.00, cheliceral length/clypeal height 1.87–2.91; ratio of length femur I/carapace width 2.17–2.42. Intensity and relative extent of light and dark abdominal makings vary.

NATURAL HISTORY. — Label data indicate occurrence in montane forest and also shrublands of *Cliffortia*, *Erica*, and *Senecio*; some specimens were taken on moss on tree trunks and some by sifting.

DISTRIBUTION. — Volcanic uplands along the Gregory Rift in Kenya and Tanzania (Fig. 157).

ADDITIONAL MATERIAL EXAMINED. — KENYA: **Central**: Aberdare, 15 km N Kinangop, elev. 3000 m, 18 July 1948, Å. Holm (1♀ ZMUU), elev. 3070 m, 16 July 1948, Å. Holm (1♂2♀ ZMUU); Aberdare, Kinangop, elev. 3400 m, 19 July 1948, Å. Holm (1♀ ZMUU). **Rift Valley**: Cherangany (sic) Hills, Kipsait, elev. 2940 m, 8 January 1965, Å. Holm (2♂ ZMUU); Cherangani Hills, Kalelaikelat, elev. 3150 m, 12–18 February 1983, Å. Holm (3♀ ZMUU), Cherangani Hills, Kalelaikelat, elev. 3150 m, 17 February 1983, Å. Holm (1♂1♀ ZMUU) (1♂1♀ CASC); Timboroa Forest, elev. 2770 m, 4 February 1965, Å. Holm (1♀ ZMUU). TANZANIA: **Arusha**: Ngorongoro Crater rim, elev. 2250 m, 19 March 1969, Å. Holm (1♀ ZMUU); Kilimanjaro, S Bismark Hut, elev. 2200 m, 16 March 1969, Å. Holm (1♀ ZMUU).

Pembatatu gongo, new species

Figures 92B, C; 95A–D; 96B; 157

TYPES. — Male holotype and female paratype from Kenya, Mt. Kenya, on low shrubs in *Hagenia*/*Podocarpus* forest, elev. ca. 3200 m, 6 January 1986, A. Russell-Smith, deposited in CASC.

ETYMOLOGY. — Swahili, club, referring to the blunt PEP.

DIAGNOSIS. — Males are distinguished from *P. embamba* by having male metatarsus I swollen and from *P. mafuta* in retaining the blunt PEP in addition to the strongly toothed arborescent base (Fig. 95D); there are no consistent characters to distinguish among the females of *Pembatatu*.

MALE (holotype). — Total length 2.15. Carapace, clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, faintly mottled with black on pars cephalica and with narrow dark stripe anteriad of thoracic fovea, black surrounding AME, PME, and lateral eyes, sternum dusky orange-brown; coxae, trochanters and legs yellow-white, femora dusky distally, patellae laterally, tibiae and metatarsi with dark apical annuli; pedipalpi yellow-white except cymbium dark grey-brown; abdomen dark grey with light lateral band and white dorsally outlining pair of dark anterior longitudinal bands, three median transverse spots, and posterior transverse band, posterior of abdomen white from spinnerets to apex, venter brown between pedicel and epigastric furrow. Carapace 0.97 long, 0.66 wide, 0.34 high; PER 0.39 wide, AER 0.38 wide, OAL 0.17; all eyes equal in size, diameter 0.05. Clypeus 0.10 high, chelicerae 0.42 long. Sternum 0.53 long, 0.48 wide; labium 0.11 long, 0.17 wide; pedipalpal coxae 0.21 long, 0.14 wide. Metatarsus I swollen; leg measurements (Femur +

Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.55 + 0.25 + 1.32 + 1.13 + 0.62 = [4.87]; II: 1.28 + 0.23 + 1.10 + 0.89 + 0.64 = [4.14]; III: 0.79 + 0.21 + 0.62 + 0.55 + 0.42 = [2.59]; IV: 1.00 + 0.21 + 0.74 + 0.59 + 0.40 = [2.94]; pedipalpus: 0.36 + 0.11 + 0.09 + (absent) + 0.33 = [0.89]. Abdomen triangular, only sclerotized ventrally between pedicel and epigastric furrow. Palpus with cymbial RMP bluntly conical (Fig. 95A), tegulum apex weakly pustulate, MLT denticulate patch covering median half of lobe; C inner margin fimbriate proximally, lower process thick (Fig. 95B, C); PEP distally blunt, strongly toothed base arborescent (Fig. 95D).

VARIATION (N = 3). — Total length 2.15–2.40; ratios of carapace length/width 1.36–1.47, height/width 0.46–0.60; ratios of PER/OQP 2.45–2.64, PER/OAL 2.23–2.31, OQP/OQA 1.08–1.36, diameter AME/PME 1.00–1.18; ratios of clypeal height/diameter AME 1.38–2.00, cheliceral length/clypeal height 4.00–4.55; ratio of length femur I/carapace width 2.03–2.32. Thoracic fovea may have a posterior pit. Markings may be paler or darker than the holotype, and the relative extent of light and dark markings on the abdomen may vary.

FEMALE (paratype). — Total length 1.94. Markings and structure (Fig. 92B, C) as in male except paler; palpal femur-tibia yellow-white, tarsus yellow-brown; legs unmodified. Carapace 0.90 long, 0.67 wide, 0.37 high; PER and AER 0.38 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.00:1.25:1.25:1.25, PME diameter 0.05. Clypeus 0.18 high, chelicerae 0.38 long. Sternum 0.55 long, 0.49 wide; labium 0.11 long, 0.17 wide; pedipalpal coxae 0.21 long, 0.15 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.34 + 0.25 + 1.15 + 1.00 + 0.62 = [4.36]; II: 1.06 + 0.21 + 0.94 + 0.72 + 0.57 = [3.50]; III: 0.68 + 0.21 + 0.53 + 0.47 + 0.42 = [2.31]; IV: 0.85 + 0.21 + 0.68 + 0.47 + 0.45 = [2.66]; pedipalpus: 0.28 + 0.08 + 0.14 + (absent) + 0.31 = [0.81]. Epigynum as in *P. embamba*, vulva as in Fig. 96B.

VARIATION (N = 3). — Total length 1.94–2.45; ratios of carapace length/width 1.34–1.46, height/width 0.50–0.55; ratios of PER/OQP 2.57–2.86, PER/OAL 2.25–2.50, OQP/OQA 1.00–1.27, diameter AME/PME 0.80–1.33; ratios of clypeal height/diameter AME 1.83–2.00, cheliceral length/clypeal height 2.11–3.64; ratio of length femur I/carapace width 1.97–2.03. Cephalothorax yellow-brown to dark red-brown; intensity and relative extent of light and dark abdominal makings vary.

NATURAL HISTORY. — Label data indicate occurrence in the understory of montane forest, where specimens were collected by sifting vegetation, litter and debris from tree trunks and branches, by sifting leaf litter in bamboo thickets, and from grass tussocks. All specimens were collected from above 3000 m in *Podocarpus*-bamboo forests and in the *Hypericum-Hagenia* zone.

DISTRIBUTION. — Mount Kenya, Kenya (Fig. 157).

ADDITIONAL MATERIAL EXAMINED. — KENYA: **Central**: Mt. Kenya: July 1975, R. Bosmans (1♂ MRAC), Naro Moru Track, W. face, elev. 3050 m, 15 September 1977, G. Coulon (1♀ MRAC), at meteorological station, elev. 3050 m, 11 January 1975 (1♀), elev. 3070 m, 12 January 1975 (1♂), above meteorological station, elev. 3100 m, 11 January 1975 (1♀), elev. 3190 m, 9 January 1975 (1♀), W side, elev. 3200 m, 10 January 1972 (1♀), Teleki Valley, elev. 3080 m, 25 July 1948 (3♀) (all collected by Å. Holm, ZMUU).

Pembatatu mafuta, new species
Figures 6A, B, D, E; 7A, B; 92A; 9C; 96A; 97A–D; 98A–C; 157

TYPES. — Male holotype from Kenya, Mt. Elgon, sifting moss on tree branches, elev. 2650 m, 22 February 1948, Å. Holm, deposited in ZMUU. Paratypes, 5 males and 8 females, 1 male and female in CASC, remainder in ZMUU.

ETYMOLOGY. — Swahili, fat, referring to the swollen male metatarsus I.

DIAGNOSIS. — Males are distinguished from other *Pembatatu* by having the PEP reduced to the strongly toothed arborescent base (Fig. 97D), and from *P. embamba* in having metatarsus I swollen (Fig. 92A); there are no consistent characters to distinguish among the females of *Pembatatu*.

MALE (holotype). — Total length 2.25. Carapace (Fig. 92A) orange-brown, faintly mottled with black on pars cephalica and with faint dark stripe anteriad of thoracic fovea, black surrounding AME, PME, and lateral eyes; clypeus, chelicerae, and pedipalpal coxae orange-brown, labium and sternum dusky red-brown; coxae and trochanters yellow-white, legs yellow-brown, femora, patellae and bases of tibiae dusky, tibiae and metatarsi with apical annuli, pedipalpi yellow-white except apex of tibia and cymbium dark grey; abdomen pale grey with longitudinal lateral dark grey bands meeting posteriorly to outline white marks forming three dorsomedian triangles, the anterior attached to procurved lateral bands, and posterior of abdomen white from spinnerets to apex except for two transverse dark bands, venter brown between pedicel and epigastric furrow, dark grey posteriorly. Carapace 1.07 long, 0.74 wide, 0.38 high, thoracic fovea a shallow oval depression with a small posterior pit; PER 0.41 wide, AER 0.42 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.30:1.20:1.00:1.20, PME diameter 0.05. Clypeus 0.13 high, chelicerae 0.40 long. Sternum 0.59 long, 0.53 wide; labium 0.11 long, 0.19 wide; pedipalpal coxae 0.19 long, 0.11 wide. Metatarsus I swollen; leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.62 + 0.28 + 1.28 + 1.21 + 0.87 = [5.26]; II: 1.28 + 0.25 + 1.17 + 1.00 + 0.66 = [4.36]; III: 0.89 + 0.21 + 0.70 + 0.62 + 0.42 = [2.84]; IV: 1.11 + 0.23 + 0.89 + 0.70 + 0.45 = [3.38]; pedipalpus: 0.40 + 0.16 + 0.10 + (absent) + 0.41 = [1.07]. Abdomen trapezoidal, sclerotized between epigastric furrow to and surrounding pedicel. Palp with cymbial RMP digitate (Fig. 98B), PC narrow in lateral view; tegulum (Figs. 97A–C; 98A, B) apex weakly pustulate, MLT denticulate patch extending for more than two thirds length; C inner margin smooth, lower process slender; PEP reduced to strongly toothed arborescent base (Fig. 97D).

VARIATION (N = 4). — Total length 2.25–2.40; ratios of carapace length/width 1.42–1.46, height/width 0.48–0.58; ratios of PER/OQP 2.71–2.78, PER/OAL 2.37–2.60, OQP/OQA 1.00–1.08, diameter AME/PME 1.30–1.33; ratios of clypeal height/diameter AME 1.85–2.33, cheliceral length/clypeal height 2.85–3.17; ratio of length femur I/carapace width 2.03–2.18. Intensity and relative extent of light and dark abdominal makings vary.

FEMALE (paratype). — Total length 2.17. Markings and structure as in male except legs unmodified and abdomen not sclerotized around pedicel. Carapace 0.93 long, 0.64 wide, 0.30 high; PER 0.38 wide, AER 0.37 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.44:1.11:1.00:1.22, PME diameter 0.05. Clypeus 0.13 high, chelicerae 0.35 long. Sternum 0.53 long, 0.47 wide; labium 0.14 long, 0.17 wide; pedipalpal coxae 0.21 long, 0.17 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.17 + 0.23 + 1.00 + 0.85 + 0.64 = [3.89]; II: 0.94 + 0.23 + 0.81 + 0.66 + 0.51 = [3.15]; III: 0.68 + 0.21 + 0.49 + 0.46 + 0.38 = [2.22]; IV: 0.85 + 0.20 + 0.64 + 0.51 + 0.38 = [2.58];

pedipalpus: 0.27 + 0.09 + 0.16 + (absent) + 0.31 = [0.83]. Epigynum as in Fig. 98C, vulva as in Fig. 96A.

VARIATION (N = 4). — Total length 2.06–2.40; ratios of carapace length/width 1.34–1.44, height/width 0.45–0.55; ratios of PER/OQP 2.57–2.85, PER/OAL 2.25–2.64, OQP/OQA 0.93–1.08, diameter AME/PME 1.11–1.44; ratios of clypeal height/diameter AME 1.85–2.40, cheliceral length/clypeal height 2.61–3.33; ratio of length femur I/carapace width 1.79–1.93. Intensity and relative extent of light and dark abdominal makings vary.

NATURAL HISTORY. — Label data indicate that specimens were taken on mossy tree trunks and branches, including *Stoebe*, *Erica* and *Hagenia*, and by sifting leaf litter. All specimens were collected above 2500 m.

DISTRIBUTION. — Mount Elgon, Kenya (Fig. 157).

ADDITIONAL MATERIAL EXAMINED. — KENYA: **Western**: Mount Elgon, elev. 3200 m, 9 March 1938 (5♂4♀), Elgon, E side, elev. 3050 m, 13 January 1965 (1♂), Mount Elgon, elev. 2540 m, 3 February 1938 (1♂1♀), Mount Elgon, elev. 2500 m, 4 March 1948 (1♂), Mount Elgon, elev. 3300 m, 25 March 1938 (1♂), Mt. Elgon, E side, elev. 3370 m, 27 July 1975 (1♂) (all Å. Holm, ZMUU).

Pokennips, new genus

TYPE SPECIES. — *Cyatholipus dentipes* Simon, 1894, here designated.

ETYMOLOGY. — An arbitrary combination of letters; gender masculine.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Pokennips* autapomorphies are the thickened and curved femur I (1:1), ventral teeth on male metatarsus I (4:1), chelicerae with three promarginal teeth (15:0) and a basal protuberance (16:1), uniquely shaped conductor (32:5) transversely oriented (33:1), PEP (40:1) that is sclerotized (41:0), and epigynal atrial furrows that extend anteriad of scape (55:1). Synapomorphies with *Ilisoa* are the coarse, long and stout abdominal setae (24:1) and epigynal scape that extends to the posterior margin of MH (54:1). *Pokennips* shares with *Teemenaarus* a thickened and curved femur I (1:1), 3 teeth on the cheliceral promargin (15:0), a transverse conductor (33:1), and a PEP (40:1) that is sclerotized (41:0), but it is more parsimonious to consider *Pokennips* related to *Ilisoa*. It lacks the *Cyatholipus* apomorphies PEP pustules (42:1) and denticulate retrolateral surface of the conductor (34:1) (that also occurs in *Teemenaarus*) and is transferred from *Cyatholipus*.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Cyatholipus*, *Hanea*, *Ilisoa*, *Lordhowea*, *Matilda*, and *Umwani* by having the abdomen nearly round (Fig. 100B, C) when viewed laterally, from all but *Cyatholipus*, *Ilisoa*, and *Matilda* in having the abdomen with coarse setae (Fig. 100A), and from these genera in having the promargin of fang furrow with three teeth, the male palp with a smooth, sclerotized PEP (Fig. 102A), male leg I modified, thicker than leg II, with the femur curved and metatarsus with ventral spurs (Fig. 100A), and the female epigynum with a slender S.

DESCRIPTION. — See species description below of *P. dentipes* (Simon) 1894.

COMPOSITION. — One species.

DISTRIBUTION. — Probably restricted to the Cape region of South Africa (Fig. 151). The species was originally recorded by Simon (1894:713) as being from Jamaica. This locality has remained enigmatic for a century, with searches of collections from the Caribbean failing to turn up another specimen. No other Cyatholipidae have been discovered in the Americas. A series of this species has been recently collected at Buffels Bay in South Africa. At most the species occurs in both Jamaica and South Africa, but it is possible that Simon's original locality record was in error, and that the type was also collected in South Africa.

Pokennips dentipes (Simon, 1894)
Figures 3F; 5E; 99B, D, F; 100A–C; 101A–D; 102A–C; 103A–C; 150; 151

Cyatholipus dentipes Simon, 1894:713 (type ♂ and associated ♀ from "Jamaica," MNHN #16.569, examined). Roewer 1942:968. Bonnet 1956:1296. Wunderlich 1986:223. Platnick 1989:181.

DIAGNOSIS. — See generic diagnosis above.

MALE (Buffels Bay). — Total length 2.42. Carapace orange-brown (Fig. 100A), unmarked except darker on region of thoracic fovea and along margin of pars cephalica, ocular area with black broadly surrounding and extending between AME and narrowly surrounding lateral eyes; clypeus yellow-white, chelicerae yellow-brown shading to orange-brown basally; labium and sternum orange-brown, darker along margins; pedipalpal coxae orange-brown basally, lighter apically; coxae, trochanters, legs, and pedipalpi nearly white, unmarked except for faint basal annuli on all femora and median annuli on femora and tibiae III and IV; abdomen with cuticle nearly transparent, with large white guanine granules showing through; cuticle markings include two pair of posterodorsal and a pair of posterolateral black spots, faint longitudinal lateral and ventrolateral dark bands, and dusky ventral markings between spinnerets and spiracle and epigastric furrow and pedicel, with book lung covers white. Carapace 1.15 long, 0.87 wide, 0.41 high, broadly oval in dorsal view, profile evenly curved, texture smooth to finely granulate, with posterior encircling ridges forming weak carina, posterior margin truncate; pars cephalica with median row of 2–3 setae and 1–2 setae along lateral margin; thoracic fovea shallow, broad, diamond-shaped; PER 0.50 wide, AER 0.49 wide, OAL 0.22; ratio AME:ALE:PME:PLE, 1.36:1.28:1.00:1.14, PME diameter 0.07. Clypeus 0.16 high, chelicerae 0.49 long, with strong basal protuberance, pro- and retromargins of fang furrow with 3 teeth. Sternum 0.60 long, 0.61 wide, with large pustules at setal bases, unsclerotized cuticle surrounds coxae; labium 0.16 long, 0.21 wide; pedipalpal coxae 0.23 long, 0.21 wide. Legs setose, fairly short, femur I much thicker than II, weakly curved, metatarsus I with three small ventral spurs in distal third (Fig. 100A). Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.29 + 0.38 + 1.34 + 0.85 + 0.64 = [4.50]; II: 1.15 + 0.34 + 1.13 + 0.79 + 0.62 = [4.03]; III: 0.70 + 0.25 + 0.51 + 0.53 + 0.42 = [2.41]; IV: 0.94 + 0.28 + 0.64 + 0.55 + 0.42 = [2.83]; pedipalpus: 0.35 + 0.14 + 0.13 + (absent) + 0.46 = [1.08]. Abdomen nearly round, unsclerotized, with long, coarse setae dorsally and posteriorly, bases of anterior setae forming small picks. Palpus (Figs. 101A–C; 102A, B) with cymbial RMP pointing ventrad, slender, very short, not extending beyond cymbial margin (Fig. 5E), PC a broad curve in lateral view; tegulum apex convex, with few wrinkles, MLT small, without denticles; E very thick, making simple curve, origin at near 12 o'clock; C large, smooth, twisted to curve transversely; PEP large, concave, smooth, sclerotized (Fig. 101D).

VARIATION (N = 2). — Total length 1.95–2.42. Carapace length 1.29–1.31 times width, maximum height 0.47–0.51 width, PER width 2.18–2.46 OQP, 2.28–2.46 OAL, OQP

1.10–1.14 times OQA, distance PME–PLE 1.00–1.28 times PME diameter, AME diameter 0.90–1.36 times PME diameter, clypeus height 1.58–2.22 times AME diameter, cheliceral length 2.40–3.15 times clypeus height; sternum length 0.98–1.03 times width; femur I length 1.47–1.73 times carapace width.

FEMALE (Buffels Bay). — Total length 2.36. Markings (Fig. 100B, C) as in male except carapace, clypeus, chelicerae, labium, sternum, and pedipalpal coxae red-brown, carapace dark along lateral margin and along margin of pars cephalica, legs yellow-white, femora with basal, median and distal annuli, tibiae III and IV with median and distal annuli, abdomen with dorsolateral, lateral and ventrolateral longitudinal dark bands, three transverse posterior chevrons, venter with dark rings around spinnerets and epigynum, and dark between spiracle and epigastric furrow. Structure as in male except leg I unmodified, similar in size to leg II, and cheliceral basal protuberance weak. Carapace 0.95 long, 0.77 wide, 0.35 high; PER 0.45 wide, AER 0.44 wide, OAL 0.21; ratio AME:ALE:PME:PLE, 1.12:1.00:1.00:1.12, PME diameter 0.08. Clypeus 0.14 high, chelicerae 0.36 long. Sternum 0.54 long, 0.55 wide; labium 0.14 long, 0.21 wide; pedipalpal coxae 0.23 long, 0.17 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.04 + 0.32 + 0.91 + 0.66 + 0.49 = [3.42]; II: 0.96 + 0.28 + 0.79 + 0.62 + 0.51 = [3.16]; III: 0.70 + 0.25 + 0.51 + 0.45 + 0.40 = [2.31]; IV: 0.87 + 0.21 + 0.59 + 0.51 + 0.42 = [2.60]; pedipalpus: 0.23 + 0.10 + 0.18 + (absent) + 0.29 = [0.80]; spinnerets typical. Epigynum as in Figs. 102C, 103A–C, with long, slender, flexible S fused with MH; vulva as in Fig. 99B, D, F, with large hyaline AD extending broadly anteriad to apicodorsal curved chamber and extending posteriad as broad curve to enter HS laterally.

VARIATION (N = 3). — Total length 2.00–2.40. Carapace length 1.23–1.29 times width, maximum height 0.41–0.46 times width, PER width 2.09–2.35 times OQP, 2.04–2.67 times OAL, OQP 1.05–1.24 times OQA, distance PME–PLE 0.94–1.12 times PME diameter, AME diameter 1.00–1.12 times PME diameter, clypeus height 1.44–1.75 times AME diameter, cheliceral length 2.61–2.95 times clypeus height; sternum length 0.98–1.04 times width; femur I length 1.27–1.35 times carapace width.

NATURAL HISTORY. — Data with the Buffels Bay specimens indicate that they came from sand dunes, which were probably densely vegetated (Fig. 3F).

DISTRIBUTION. — Probably restricted to western Cape of South Africa (Fig. 151).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Buffels Bay, Cape Peninsula, 12 August 1978, A. Russell-Smith (1♂5♀ CASC). JAMAICA (locality possibly in error: could be from South Africa) (*Cyatholipus dentipes* types 1♂1♀ MNHN).

Scharffia Griswold, 1997

Scharffia Griswold 1997b:270 (type species by original designation, *S. chinja* Griswold 1997, from Tanzania).

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Scharffia* synapomorphies are the long, narrow sternum (14:1), hemispherical vulval AD that are at least twice as large as the HS (46:1), and epigynal atrial furrows that extend anteriad of scape (55:1); the annulate abdominal petiole (21:1) is a synapomorphy suggesting *Scharffia* as the sister group of *Alaranea* from Madagascar.

DIAGNOSIS. — Distinguished from all Cyatholipidae by having the sternum elongate (Fig. 104B, F), prolonged between coxae IV, with length greater than 1.15 times width, and from all genera except *Alaranea* by having the anterior portion of abdomen of both sexes forming a sclerotized, annulate petiole, in most species elongate (Figs. 4A, 104A–F).

DESCRIPTION. — Total length 2.25–3.25. Carapace typically trapezoidal or diamond-shaped in dorsal view (Fig. 104A), may be prolonged posteriorly, length 1.58–2.43 times width, posterior margin truncate, profile nearly flat (Fig. 104E), low, maximum height 0.35–0.57 width, rugose; thoracic fovea typically shallow, diamond-shaped to indistinct; ocular area with PER width 2.18–2.93 times OAL, 2.25–2.80 times OQP, OQP 0.87–1.20 times OQA; diameter AME 1.09–1.87 times PME, distance PME–PLE 1.20–2.25 times PME diameter; clypeal height 1.86–2.80 times AME diameter, cheliceral length 1.35–2.54 times clypeal height; chelicerae unmodified or with small basal protuberance, promargin with 4, retromargin with 3 teeth. Sternum rugose to pustulate, length 1.15–1.58 times width, coxae surrounded by pleural and sternal sclerotizations. Abdomen oval (Fig. 104A–D) to triangular (Fig. 104E), with short, slender setae, bases of anterior setae unmodified, sclerotized from epigastric furrow to and surrounding pedicel to form short to long annulate petiole, spinnerets surrounded by yellow-brown sclerotization with dark radial streaks (Fig. 104F); spinnerets typical (Fig. 8A). Legs unmodified, long to extremely long, leg formula 1243, female femur I length 2.42–4.67 times carapace width, male 2.51–9.48. Male palpus with RMP pointing ventrad (Fig. 107B, E), smaller than PC; palpal bulb (Fig. 109A–D) with dentate MLT, apex a small, smooth to pustulate lobe; C median, longitudinal, simple (Fig. 107D) or with accessory process (Fig. 107A), smooth; E thick, making simple curve, origin apical at between 10–11 o'clock, ridged; PEP present (Fig. 105D) or absent (Fig. 109C, D), thick and fleshy with a median attenuate projection, lacking teeth, with or without pustules; reservoir with curlicue near embolic base. Epigynum (Figs. 106A–C, 107C) with S and MH with slender septum between CO, atrial furrows extending behind S. Vulva (Fig. 108A–E) with sclerotized, simple, narrow to hemispherical lateral AD, FD posterior to spermathecal head (HS).

COMPOSITION. — Four species.

NATURAL HISTORY. — See each species below.

DISTRIBUTION. — East Africa from Malawi to Kenya (Fig. 156).

Scharffia chinja Griswold, 1997

Figures 2A; 4A; 8A; 104C–F; 105A–D; 107A–C; 108A, D, E; 109A; 156

S. chinja Griswold 1997b:272 (♂ holotype from Uzungwa Scarp Forest Reserve, Tanzania, ZMUC, examined).

DIAGNOSIS. — Distinguished from *Scharffia nyasa* by having the abdominal petiole greater than 0.24 times carapace length (Fig. 104C–F); males distinguished from *S. rossi* and *S. holmi* by having a PEP and bipartite C (Fig. 107A, B); females distinguished from *S. holmi* by having a broad S (Fig. 107C) and hemispherical AD (Fig. 108A, D, E).

DESCRIPTION. — See Griswold 1997b:272–277.

NATURAL HISTORY. — The spiders hang beneath sheet webs in shaded areas in forest (Fig. 2A). In addition to juveniles and adult females, adult males may be found in intact webs, and both sexes may occur in the same web.

DISTRIBUTION. — Eastern Arc mountains and nearby lowlands of Tanzania (Fig. 156).

MATERIAL EXAMINED. — TANZANIA: **Coast**: Kisarawe District: Kazimzumbwe Forest Reserve, 20 km SW Dar-es-Salaam, 6°57′S, 39°03′E, elev. 120–280 m, January–February 1991, Frontier Tanzania Expedition (1♂2♀ ZMUC). **Tanga**: East Usambara Mts. (all C. Griswold, D. Ubick, and N. Scharff, 1995, CASC and ZMUC): Amani, 5°05′S, 38°38′E, elev. 950 m, 27 October–9 November (50♂63♀), Mbomole Hill, 5°05′S, 38°37′E, elev. 1000 m, 5–8 November (2♂15♀), Kwamkoro Forest Reserve, 5°10′S, 38°35′E, elev. 950 m, 6 November (8♂13♀), Sangarawe Forest, 38°35′E, 5°06′S, elev. 990 m, 5–6 November (1♂3♀); Segoma Forest Reserve, 4°58′S, 38°45′E, primary rain forest, 17 February 1987, S. Mahunka, T. Pòcs, and A. Zicsi (1♀ HMNH); West Usambara Mts., Mazumbai, 4°49′S, 38°30′E, elev. 1400–1600 m, 10–20 November 1995, C. Griswold, D. Ubick, and N. Scharff (15♂45♀ CASC, ZMUC), 1 August 1980, M. Stoltze and N. Scharff (1♂1♀ ZMUC). **Morogoro**: Uzungwa Mts.: Mwanihana Forest Reserve (all N. Scharff, 1984, ZMUC): elev. 500–700 m, 7–16 September (1♂), elev. 500–600 m, 11–14 September, pitfalls (1♀), elev. 700 m, 7 September, litter (1♀), elev. 1400 m, 27 September (1♀), elev. 1650 m, 25–29 September, litter (1♀), elev. 1800–1850 m, 28–29 September, netted (1♀); Mwanihana Forest Reserve above Sanje (all M Stoltze and N. Scharff, ZMUC): elev. 600 m, 3 August 1982 (1♀), elev. 700 m, 10 September 1984 (1♀), 12 September 1984, netted (2♂), elev. 750 m, 1 August 1981 (5♂), elev. 1000 m, 1 August 1981 (2♀), 1 August 1982 (1♂3♀), elev. 1250 m, 25 July 1982 (1♂1♀), elev. 1650 m, 18 August 1982, litter (1♂2♀), pitfall (3♀). **Iringa**: Uzungwa Scarp Forest Reserve above Chita village (all N. Scharff, 1984, ZMUC): elev. 1050 m, 26 October, litter (1♀), 5 November 1984 (holotype ♂), elev. 1300 m, 2–6 November (1♀), elev. 1300 m, 3 November, litter (1♀), elev. 1400 m, 4 November, netted (1♀), 10 November, netted (2♀), elev. 1500 m, 9 November, litter (1♂), 11 November, netted (1♂2♀), elev. 1600 m, 10 November (1♀), elev. 1650 m, 13 November, netted (1♂1♀). **Mbeya**: Mt. Rungwe SW, elev. 1900 m, 20 August 1984, M. Stoltze and N. Scharff (1♂ ZMUC).

Scharffia holmi Griswold, 1997
Figures 104A, B; 108B; 109C; 156

S. holmi Griswold 1997b:277 (♂ holotype and 2♀ paratypes from Mount Elgon, Kenya, ZMUU, examined).

DIAGNOSIS. — Distinguished from all *Scharffia* except *S. rossi* by lacking a PEP (Fig. 109C), having a simple C, and having the cephalothorax prolonged posteriorly to form a parallel-sided neck (Fig. 104A, B), and from *S. rossi* by having the length of the palpal bulb greater than 2.5 times length of the MLT, with the tegulum clearly visible between MLT and E (Fig. 109C). The epigynum is unique in *Scharffia* in having a narrow S (Griswold 1997b, fig. 33) twice as long as wide, and the vulva unusual in Cyatholipidae in having a lateral AD that is smaller than the HS (Fig. 108B).

DESCRIPTION. — See Griswold 1997b:277–278.

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Known only from the type locality in Kenya (Fig. 156).

MATERIAL EXAMINED. — KENYA: **Western**: Mount Elgon, elev. 2300 m, 23 December 1937, Å. Holm (♂ holotype, 2♀ paratypes ZMUU).

Scharffia nyasa Griswold, 1997
Figures 106A–C; 108C; 109B; 156

S. nyasa Griswold 1997b:278 (♂ holotype and ♀ paratype from Mt. Mulanje, Malawi, MRAC #156.180, examined).

DIAGNOSIS. — Distinguished from all other *Scharffia* by having the petiole short, length less than 0.17 carapace length (Griswold 1997b, figs. 24, 41–43); also leg I extremely long (Griswold 1997b, fig. 43), femur I of female greater than 3.5, that of male greater than 5.4 times carapace width.

DESCRIPTION. — See Griswold 1997b:278–280.

NATURAL HISTORY. — Data on collection labels indicate occurrence in montane forest, where specimens were collected in litter and by sweeping.

DISTRIBUTION. — Known only from the type locality in Malawi (Fig. 156).

MATERIAL EXAMINED. — MALAWI: Mt. Mlanje (all R. Jocqué, 1981, MRAC): Thuchila Hut, Nambiti stream, elev. 2000 m, 11 November (1♂1♀); Lichenya Plateau, *Widdringtonia* evergreen forest, elev. 2000 m, 4 November (3♂2♀), 4–6 November (1♀), 5 November (1♀), 7 November (holotype ♂, paratype ♀ and 1♀), 19 November (1♂3♀), 21 November (8♂30♀).

Scharffia rossi Griswold, 1997
Figures 107D, E; 109D; 156

S. rossi Griswold 1997b:280 (♂ holotype from Naabi, Tanzania, CASC type #17335, examined).

DIAGNOSIS. — Distinguished from all *Scharffia* except *S. holmi* by lacking a PEP, having a simple C (Fig. 107D, E), and having the carapace prolonged posteriorly to form a parallel-sided neck (Griswold 1997b, fig. 1), and from *S. holmi* by having the MLT large, with bulb length less than 2 times length MLT, tegulum nearly hidden between MLT and E (Fig. 109D).

DESCRIPTION. — See Griswold 1997b:280–283.

NATURAL HISTORY. — The specimen was collected on a hilltop in shade beneath tall umbrella acacias with an understory of grass and stones.

DISTRIBUTION. — Known only from the type locality in Tanzania (Fig. 156).

MATERIAL EXAMINED. — TANZANIA: **Mara**: 1750 m at Naabi, Serengeti Plain, Tanzania, 25 October 1957, E. Ross and R. Leech (holotype ♂ CASC).

Ubacisi **new genus**

TYPE SPECIES. — Type species, here designated, *Isicabu capensis* Griswold 1987, from Table Mountain, South Africa.

ETYMOLOGY. — An anagram of *Isicabu*; gender masculine.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — Details of the palpal bulb are autapomorphies for this monotypic genus. It lacks the synapomorphies of *Isicabu*, and is excluded from that genus. The presence of PEP pustules (42:1) suggests that *Ubacisi* is the sister group of a suite of African and Malagasy genera including *Buibui*, *Uvik*, *Wanzia*, *Isicabu*, *Scharffia* and *Alaranea*.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Tekelloides*, *Toddiana*, *Ulwembua*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Fig. 110), from *Alaranea*, *Buibui abyssinica*, *Isicabu henriki*, *I. kombo*, *I. margrethae*, *Scharffia*, *Toddiana*, *Uvik*, and *Wanzia* in having the coxae surrounded by soft cuticle, with sclerotized points not meeting, and from *Teemenaarus* in lacking coarse setae and a petiole on the abdomen. Males are distinguished from *Isicabu*, *Kubwa*, *Pembatatu*, *Tekellatus*, *Tekelloides*, *Ulwembua*, and *Vazaha* by having the inner side of the E denticulate distad of PEP (Figs. 111C, D; 112A). Females are distinguished from *Kubwa*, *Pembatatu*, *Tekellatus*, *Tekelloides*, *Ulwembua*, and *Vazaha* by having the vulval AD sclerotized, hemispherical, equal to HS (Fig. 114A–C), and from *Isicabu* in having the carapace oval in dorsal view, evenly curved in profile, with the posterior margin truncate (Griswold 1987c, figs. 78, 92).

DESCRIPTION. — Total length 2.20–2.95. Carapace oval in dorsal view, length 1.40–1.57 times width, profile evenly curved (Fig. 110), maximum height 0.42–0.51 width, texture rugose; thoracic fovea a shallow oval depression with small posterior pit; carapace posterior margin truncate; ocular area with PER width 2.10–2.41 times OAL, 2.41–2.73 times OQP, OQP 1.05–1.08 times OQA; diameter AME 1.08–1.60 times PME, distance PME–PLE 1.17–1.67 times PME diameter; clypeal height 1.85–3.17 times AME diameter, cheliceral length 1.87–2.54 times clypeal height; chelicerae convex basally, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum rugose to weakly pustulate, length 1.04–1.08 times width, coxae not surrounded by sclerotized cuticle. Abdomen triangular, weakly sclerotized between epigastric furrow and pedicel, not petiolate; abdominal setae fine; spinnerets typical. Legs long, formula 1243, femur I 2.71–4.30 times carapace width, unmodified. Male palpus with cymbial RMP pointing ventrad (Fig. 111A), smaller than PC; palpal bulb (Figs. 111B, C; 112A, B) with MLT with transversely oval denticulate patch, apex a pustulate lobe; C median, longitudinal, bipartite; E thick with pars pendula extending for most of length, length less than one rotation, base smooth, origin at 2 o'clock; PEP fleshy, folded, with weak pustules and teeth; inner side of E denticulate distad of PEP (Fig. 111D). Epigynum (Figs. 112C, 113A–C) with S and MH, AT confluent with S anteriorly, ML parallel sided. Vulva (Fig. 114A–C) AD hemispherical, sclerotized, equal to HS; FD posterior.

COMPOSITION. — One species.

NATURAL HISTORY. — The spiders hang beneath sheet webs in shaded areas in forest.

DISTRIBUTION. — Known only from moist, wooded canyons on the slopes of Table Mountain, near Cape Town, South Africa (Fig. 152).

Ubacisi capensis (Griswold, 1987)

Figures 110; 111A–D; 112A–C; 113A–C; 114A–C; 152

Isicabu capensis Griswold 1987c:528 (♂ holotype from Table Mountain, near Cape Town, South Africa, NMSA type #3385, examined). Platnick 1989:182.

DIAGNOSIS. — See generic diagnosis.

DESCRIPTION. — See Griswold (1987c:528–532).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Table Mountain, near Cape Town: Skeleton Gorge, Kirstenbosch, 33°59'S, 26°18'E, 26, 29 October 1985, C. Griswold, J. Doyen and T. Meikle (holotype ♂ and paratypes: 1♂8♀ NMSA, ♂♀ AMNH, ♂♀ CASC, ♂♀ MRAC, and 1♀ each in NCP, BMNH, SMF, MNHN, USNM, OMD, and NMZ), Skeleton Gorge, 13 February 1991, V. and B. Roth (5♂4♀ CASC), Newlands Ravine, elev. 120 m, 33°58'S, 18°27'E, 18 December 1996, C. Griswold (6♂18♀ CASC), Fernwood Gulley, elev. 150 m, 33°58'S, 18°27'E, 18 December 1996, C. Griswold (1♂3♀ CASC).

Ulwembua Griswold, 1987

Ulwembua Griswold 1987c:532 (type species, by original designation, *U. pulchra* Griswold 1987c, from Zululand, South Africa). Platnick 1989:182.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Ulwembua* synapomorphies are the carapace with a light mark on dark background (11:1) and unique conformation of the hyaline vulval AD (49:1). The undivided C (31:0), loss of the PEP (40:0), and epigynal atrial furrows that extend anteriad of scape (55:1) suggest that *Ulwembua* is the sister group of a clade containing *Ilisoa*, *Pokennips*, and *Umwani* from Africa and *Hanea* from New Zealand.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Tekelloides*, *Toddiana*, *Ubacisi*, *Uvik*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Figs. 117, 126), from *Alaranea*, *Buibui abyssinica*, *Isicabu henriki*, *I. kombo*, *I. margrethae*, *Scharffia*, *Toddiana*, *Uvik*, and *Wanzia* in having the coxae surrounded by soft cuticle, with sclerotized points not meeting (Fig. 120B), and from *Teemenaarus* in lacking coarse setae and a petiole on the abdomen (Fig. 120A, C). Males are distinguished from *Kubwa*, *Pembatatu*, *Tekelloides*, *Ubacisi*, and *Uvik* in lacking a PEP, and from *Vazaha* in having the E make more than one turn around the tegulum (Figs. 123A, 129A). Females are distinguished from *Kubwa*, *Pembatatu*, *Ubacisi*, *Uvik* and *Vazaha* in having convoluted, hyaline vulval AD (Figs. 16C, 133A–E), and from *Tekelloides* by having the epigynum nearly as long as wide. Most species have the carapace with a light mark on a dark background (Figs. 120A, 121C).

DESCRIPTION. — Total length 2.00–3.32. Carapace oval in dorsal view (Fig. 120A, C), length 1.39–1.61 times width, low in most species (Fig. 117), maximum height 0.41–0.51 width; texture finely rugose to granulate, becoming denticulate posteriorly in many individuals (Figs. 117, 126), carapace posterior margin truncate to weakly concave (Fig. 121A–C); thoracic fovea oval to round, indistinct, shallow in female and deeper in male; ocular area with PER width 1.95–2.50 times OAL, 2.30–2.80 times OQP, OQP 0.83–1.07 times OQA; diameter AME 1.00–1.80 times PME, distance PME–PLE 1.07–1.85 times PME diameter; clypeal height 1.22–3.21 times AME diameter, cheliceral length 1.84–3.20 times clypeal height; chelicerae unmodified or rarely with basal projection, promargin of fang furrow with 4 teeth, retromargin with 3. Sternum rugose (Fig. 120B) to pustulate, length 0.96–1.14 times width, coxae surrounded by unsclerotized cuticle or in some species (*U. nigra*) sclerotized points extending between coxae and nearly meeting. Abdomen triangular, unsclerotized or sclerotized around pedicel, not petiolate; abdominal setae short, slender, bases of anterior setae slightly enlarged; spinnerets typical. Legs long, formula 1243, femur

I 2.5–4.5 times carapace width, unmodified. Male palpus with cymbial RMP pointing ventrad, smaller than PC (Figs. 118D, 124D); palpal bulb (Fig. 122A–C) with dentate MLT, apex a small, smooth to pustulate lobe; C smooth, variable, median or basal, longitudinal, simple (Fig. 116B) or with accessory process (Fig. 116A); E thick, long, length usually greater than 1.1 rotation, base smooth, simple, origin apical at near 12 o'clock; PEP absent; reservoir with curlicue near embolic base. Epigynum with S and MH, septum between CO slender to broad, atrial furrows may (Figs. 15A–C, 125C) or may not (Fig. 125A, B, D) extend behind S; ML parallel-sided. Vulva (Fig. 133A–E) with extensive hyaline AD, extending anteriad, looping laterally and ventrally and then extending posteriad to join HS; FD posterior.

COMPOSITION. — Seven species.

NATURAL HISTORY. — See under each species below.

DISTRIBUTION. — Southern and eastern Africa (to Tanzania); Madagascar (Fig. 154).

Ulwembua antsiranana Griswold, 1997
Figures 3G; 115; 116A; 125A; 154

U. antsiranana Griswold 1997a:59 (♂ holotype and ♀ paratype from Parc National Montagne d'Ambre, Madagascar, CASC type #17336, examined).

DIAGNOSIS. — Males are distinguished from all other *Ulwembua* by having the C double (Fig. 116A); females by having the character combination S at the apex of the atrium (Fig. 125A) and the AD complex, having five loops (Fig. 133B).

DESCRIPTION. — See Griswold (1997a:59–61).

NATURAL HISTORY. — These spiders were common in wet montane forest (Fig. 3G). Individuals built sheet webs in low vegetation, rarely more than 30–40 cm from the forest floor.

DISTRIBUTION. — Known only from the type locality, an isolated montane rain forest in northern Madagascar (Fig. 154).

MATERIAL EXAMINED. — MADAGASCAR: **Antsiranana**: Parc National Montagne d'Ambre, 2.79 air km NE of park entrance, forest, 12°32′S, 49°10′E, elev. approx. 1000 m, 21–30 November 1993, N. Scharff, C. Griswold, J. Coddington, S. Larcher and R. Andriamasamanana (♂ holotype and ♀ paratype CASC) (31♂67♀, one pair in MRAC, remainder in CASC, USNM, and ZMUC).

Ulwembua denticulata Griswold, 1987
Figures 15A–C; 117; 118A–D; 119A–C; 120B, C; 133C; 154

U. denticulata Griswold 1987c:536 (holotype ♀ from Mevamhlope, Zululand, South Africa, NMSA type #3387, examined). Platnick 1989:182.

NOTES. — The male is described here for the first time. The diagnosis in Griswold (1987c:536) that stated "single, broad copulatory opening" is in error: SEM examination of additional specimens reveals that *U. denticulata* have two copulatory openings like other Cyatholipidae (Fig. 15C).

DIAGNOSIS. — The character combination carapace with dorsal light mark forming Y (Fig. 120C; Griswold 1987c, fig. 122) and abdomen with subcutaneous flecks or meandering streaks of guanine (Fig. 117; Griswold 1987c, fig. 121) distinguishes this species from all other *Ulwembua* (some individuals have the carapace unmarked dorsally); in addition, males are distinguished from all other *Ulwembua* except *U. pulchra* and *U. usambara* by having the C subbasal and the MLT narrow (Fig. 119A, B), from *U. usambara* by having the C relatively broad (length < 1.50 × width), and the PC notch narrow (distance between tips of RMP and PC < 1.5 × RMP length) (Fig. 118D).

MALE (Misty Mountain). — Total length 2.89. Carapace (Fig. 117) dark red-brown, dusky laterally and in middle of pars cephalica, lighter median longitudinal band extends from behind thoracic fovea anteriad to fork on margins of pars cephalica; black surrounding AME and lateral eyes; chelicerae and pedipalpal coxae red-brown, chelicerae darker at base; labium and sternum dusky red-brown; coxae, trochanters and bases of femora yellow-white, legs dusky distally except pale annuli at apices of femora and tibiae; pedipalpal femur-tibia yellow-brown, cymbium dark red-brown; abdomen grey with bright white streakes of guanine meandering beneath cuticle, dorsum dark grey outlining anterior median and paired lateral longitudinal light marks, three median and posteromedian dorsal marks, and one posterior light mark, dark grey ventrally, with brown sclerotization extending from epigastric furrow to and surrounding pedicel and spinnerets. Carapace 1.16 long, 0.79 wide, 0.31 high; PER 0.51 wide, AER 0.50 wide, OAL 0.24; ratio AME:ALE:PME:PLE, 1.42:1.28:1.00:1.28, PME diameter 0.07. Clypeus 0.23 high, chelicerae 0.35 long. Sternum 0.63 long, 0.61 wide; labium 0.13 long, 0.20 wide; pedipalpal coxae 0.22 long, 0.14 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 4.13 + 0.30 + 3.94 + 3.51 + 1.34 = [13.22]; II: 2.10 + 0.25 + 1.91 + 1.70 + 0.85 = [6.81]; III: 0.89 + 0.21 + 0.72 + 0.68 + 0.42 = [2.92]; IV: 1.42 + 0.21 + 1.15 + 0.91 + 0.49 = [4.18]; pedipalpus: 0.37 + 0.15 + 0.10 + (absent) + 0.49 = [1.11]. Palp with cymbial RMP short, narrowly pointed, PC nearly straight in lateral view, apex forked (Fig. 118 D); tegulum apex with embolic groove, MLT small, with denticulate patch; C simple, longitudinal; E sinuate across base of bulb (Figs. 119A, B; 118A–C).

VARIATION (N = 4). — Total length 2.68–2.89; ratios of carapace length/width 1.47–1.57, height/width 0.40–0.47; ratios of PER/OQP 2.70–2.88, PER/OAL 1.96–2.19, OQP/OQA 0.94–0.95, diameter AME/PME 1.38–2.00; ratios of clypeal height/diameter AME 2.00–2.20, cheliceral length/clypeal height 1.50–1.67; ratio of length femur I/carapace width 4.28–5.17. Dorsal carapace markings may be entirely dark or with clear median light mark; relative size and extent of the light and dark markings of the abdomen vary.

FEMALE. — See Griswold (1987c:536–538).

VARIATION (N = 5). — Total length 2.12–2.94; ratios of carapace length/width 1.53–1.56, height/width 0.41–0.53; ratios of PER/OQP 2.56–2.80, PER/OAL 2.33–2.41, OQP/OQA 0.88–1.07, diameter AME/PME 1.45–2.00; ratios of clypeal height/diameter AME 1.62–2.12, cheliceral length/clypeal height 1.76–2.31; ratio of length femur I/carapace width 3.08–3.92. Carapace orange-brown to dark red-brown, dorsal light mark may be a clear longitudinal oval or Y, or be absent; relative size and extent of the light and dark markings of the abdomen vary; subcutaneous guanine deposits may comprise flecks or sinuous streaks.

NATURAL HISTORY. — Specimens were found to be abundant in wet, closed-canopy forest, hanging from sheet webs less than 50 cm from ground on low vegetation and in tree buttresses. Data with the type specimen indicate that it was taken on *Senecio* in a dry area.

DISTRIBUTION. — Zululand north through the Transvaal Drakensberg mountains of Mpumalanga Province to the Soutpansberg, Northern Province, South Africa (Fig. 154).

MATERIAL EXAMINED. — SOUTH AFRICA: **Kwazulu-Natal**: Mevamhlope, Zululand, 20 September 1979, P. E. Reavell (holotype ♀ NMSA). **Mpumalanga**: Misty Mountain Hotel, ca. 32 km E Lydenberg, forest, 25°10′S; 30°40′E, el. 1890 m, 3–5 December 1996, C. E. Griswold (8♂11♀ CASC); Ceylon Forest, W of Sabie, 25°05′S; 30°42′E, el. 1100 m, indigenous forest, 4 December 1996, C. E. Griswold (5♂7♀ CASC); Blyde River Canyon, Bourke's Luck Potholes, 23–25 December 1990, V. and B. Roth (1♀ CASC). **Northern**: Hanglip Picnic Area, Soutpansberg, 8 km NW Louis trichardt, ca. 23°00′S, 29 53′E, elev. 1440 m, 30 November 1996, C. Griswold (3♀ CASC).

Ulwembua nigra, new species
Figures 121A, B; 122A–D; 123A–C; 133D; 154

TYPES. — Male holotype and female paratype from Madagascar, Antsiranana Province, Marojejy Reserve, 10.5 km NW Manantenina, elev. 1625 m, 6–12 November 1996, E. L. Quinter, deposited in AMNH.

ETYMOLOGY. — Latin, dark.

DIAGNOSIS. — Males are distinguished from all other *Ulwembua* except *U. antsiranana* by having the E strongly sinuate across the base of the tegulum (Fig. 123A), and from that species by having the C and RMP single (Fig. 122C); females are distinguished from all other *Ulwembua* by the character combination epigynum (Fig. 123C) with S at the apex of the atrium, the median septum broad, and the AD with paired median pockets separated from the lateral loops (Fig. 133D).

MALE (holotype). — Total length 2.55. Carapace (Fig. 121A) and chelicerae red-brown, finely mottled with black, black surrounding AME, PME and lateral eyes, and black extending posteriad from AME to PME, clypeus dusky between AME and cheliceral margin; pedipalpal coxae, labium and sternum dusky dark brown; coxae, trochanters, and pedipalpal femur to tibia yellow-white, cymbium brown, legs pale yellow-brown at base of femora shading to yellow-brown from femoral apex to tarsi, unmarked; abdomen (Fig. 121A) dark grey, unmarked, brown sclerotization extending from epigastric furrow to and faintly surrounding pedicel, abdomen not petiolate. Carapace 0.97 long, 0.59 wide, 0.26 high, texture granulate; thoracic fovea a shallow oval; PER 0.37 wide, AER 0.36 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.50:1.37:1.00:1.50, PME diameter 0.04. Clypeus 0.14 high, chelicerae 0.26 long. Sternum 0.50 long, 0.46 wide, rugose, sclerotized points extending between coxae and nearly meeting; labium 0.10 long, 0.16 wide; pedipalpal coxae 0.16 long, 0.10 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.59 + 0.23 + 2.59 + 2.19 + 1.04 = [8.64]; II: 1.70 + 0.23 + 1.47 + 1.28 + 0.74 = [5.42]; III: 0.74 + 0.17 + 0.62 + 0.55 + 0.42 = [2.50]; IV: 1.21 + 0.21 + 0.94 + 0.72 + 0.42 = [3.50]; pedipalpus: 0.26 + 0.11 + 0.08 + (absent) + 0.31 = [0.76]. Palp with cymbial RMP long, slender, PC slender in lateral view, making broad arc (Fig. 123B); tegulum apex with groove (Fig. 122B), lacking apical lobe, MLT denticulate; C single, large, denticulate on inner surface (Fig. 122C); E strongly sinuate across base of tegulum (Figs. 122B, 123A).

VARIATION (N = 2). — Total length 2.13–2.55; ratios of carapace length/width 1.56–1.64, height/width 0.42–0.45; ratios of PER/OQP 2.61–2.69, PER/OAL 2.18–2.27, OQP/OQA 1.00, diameter AME/PME 1.33–1.50; ratios of clypeal height/diameter AME 2.17–2.50, cheliceral length/clypeal height 1.92–1.93; ratio of length femur I/carapace width 4.36–5.60.

FEMALE (paratype). — Total length 2.55. Structure as in male; markings (Fig. 121B) as in male except carapace orange-brown mottled with black, with black median band on pars cephalica and black along lateral margin; abdomen white with lateral grey band extending from anterior margin posteriorly to apex, with pair of dorsomedian broken longitudinal dark bands, venter grey from pedicel to apex. Carapace 0.88 long, 0.52 wide, 0.23 high; PER 0.34 wide, AER 0.32 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.50:1.25:1.00:1.50, PME diameter 0.04. Clypeus 0.11 high, chelicerae 0.26 long. Sternum 0.49 long, 0.46 wide; labium 0.09 long, 0.14 wide; pedipalpal coxae 0.16 long, 0.09 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.02 + 0.23 + 1.70 + 1.55 + 0.81 = [6.31]; II: 1.38 + 0.23 + 1.08 + 1.04 + 0.64 = [4.37]; III: 0.66 + 0.17 + 0.49 + 0.47 + 0.38 = [2.17]; IV: 1.10 + 0.19 + 0.81 + 0.66 + 0.40 = [3.16]; pedipalpus: 0.20 + 0.07 + 0.11 + (absent) + 0.28 = [0.66]. Epigynum as in Fig. 123C; vulva as in Fig. 133D.

VARIATION (N = 3). — Total length 2.06–2.55; ratios of carapace length/width 1.54–1.68, height/width 0.37–0.44; ratios of PER/OQP 2.46–2.67, PER/OAL 2.28–2.31, OQP/OQA 0.92–1.08, diameter AME/PME 1.25–1.50; ratios of clypeal height/diameter AME 1.67–2.00, cheliceral length/clypeal height 2.27–2.70; ratio of length femur I/carapace width 3.33–3.80. The relative size and intensity of light and dark markings on the abdomen vary.

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Northern Madagascar (Fig. 154).

ADDITIONAL MATERIAL EXAMINED. — MADAGASCAR: **Antsiranana**: Marojejy Reserve, 10.5 km NW Manantenina, elev. 1625 m, beaten from vegetation along tributary at head of Andranomifototra River, 14° 26.4'S, 49° 44.5'E, 6–12 November 1996, E. L. Quinter (1♂2♀ AMNH); 11 km WSW Befingotra, Res. Anjanaharibe-Sud, 14°45'S, 49°27'E, elev. 1565 m, 16–20 November 1994, B. L. Fisher (1♀ CASC).

Ulwembua outeniqua Griswold, 1987

Figures 3C; 12A–C; 121C; 124A–D; 125D–F; 133A; 154

U. outeniqua Griswold 1987c:538 (holotype ♂ from Knysna Forest, South Africa, NMSA type #3388, examined). Platnick 1989:182.

DIAGNOSIS. — Males are distinguished from all other *Ulwembua* by having the E curving evenly around tegulum (Fig. 124A–C; Griswold 1987c, fig. 144); females by the character combination S at apex of epigynal atrium, the epigynum broad, width > 2 × length, and the septum narrow (Fig. 125D–F).

DESCRIPTION. — See Griswold (1987c:538–541).

NATURAL HISTORY. — Specimens were found to be abundant in wet, closed-canopy forest (Fig. 3C), hanging from sheet webs less than 50 cm from ground on low vegetation and in tree buttresses.

DISTRIBUTION. — Knysna Forest, South Africa (Fig. 154).

MATERIAL EXAMINED. — SOUTH AFRICA: **Western Cape**: Knysna Forest, near Big Tree, 33°50′S, 24°45′E, 3 February 1991, V. and. B. Roth (4♂4♀ CASC), Nature Valley, indigenous forest at coast, 34°S, 24°E, January–February 1991, V. and. B. Roth (1♀ CASC), Kranshoek, 20 km E Knysna, forest, 23°14′E, 34°05′S, elev. 180 m, 13 December 1996, C. Griswold (1♂2♀ CASC), Harkerville State Forest, 19 km E Knysna, indigenous forest, 34°03′S, 23°14′E, elev. 240 m, 11–13 December 1996, C. Griswold (8♂39♀ CASC), Diepwalle Forest Station, 21 km N Knysna, 33°57′S, 23°09′E, elev. 540 m, 13 January and 11–13 November 1985, C. Griswold and T. Meikle (holotype ♂ NMSA) (11♂ and 48♀ paratypes: ♂♀ each in CASC, BMNH, OMD, MRAC, USNM, 2♂♀ AMNH, 2♀ each in SMF, NMZ, and MNHN, remainder in NMSA), 12 December 1996, C. Griswold (8♂13♀ CASC).

Ulwembua pulchra Griswold, 1987
Figures 120A; 126; 127A–D; 128A–C; 154

U. pulchra Griswold 1987c:534 (holotype ♂ from Dlinza Forest, South Africa, NMSA type #3386, examined). Platnick 1989:182.

DIAGNOSIS. — The character combination carapace with dorsal light mark forming a backward pointing triangle (Fig. 120A) and absence of conspicuous subcutaneous guanine deposits on the abdomen (Figs. 120A, 126) distinguishes this species from all other *Ulwembua*; in addition, males are distinguished from all other *Ulwembua* except *U. denticulata* and *U. usambara* by having the C subbasal and the MLT narrow (Fig. 128A), and from *U. usambara* by having the C relatively broad (length < 1.50 × width) and the PC notch narrow (distance between tips of RMP and PC < 1.5 × RMP length) (Figs. 127D, 128B).

NOTE. — The illustrations of the male palpus in Griswold (1987c, figs. 128–130) are inaccurate in suggesting that the C orientation is transverse rather than longitudinal.

DESCRIPTION. — See Griswold (1987c:534–536).

NATURAL HISTORY. — Specimens were found to be abundant hanging from sheet webs less than 50 cm from ground on low vegetation and in tree buttresses in closed-canopy forest.

DISTRIBUTION. — Zululand, South Africa (Fig. 154).

MATERIAL EXAMINED. — SOUTH AFRICA: **Kwazulu-Natal**: Zululand, Dlinza Forest, Eshowe, 28°53′S, 31°28′E, elev. 1800 ft, 28 June 1986, C. Griswold (holotype ♂ and 1♂2♀ paratypes NMSA), (same locality) 6 October 1986 (♂♀ MRAC, ♂♀ AMNH, ♂♀ CASC, ♂♀ BMNH, ♀ NCP, 2♂4♀ NMSA).

Ulwembua ranomafana Griswold, 1997
Figures 16A, C, E; 116B; 125B; 129A–C; 154

U. ranomafana Griswold 1997a:63 (♂ holotype from Parc National de Ranomafana, Madagascar, CASC type #17337, examined).

DIAGNOSIS. — Males are distinguished from all other *Ulwembua* by having the chelicerae with a basal projection (Griswold 1997a, fig. 15) and the palpal bulb with a simple C and E weakly sinuate across the tegular base (Figs. 116B, 129A); females by having the character combination epigynum with S at the apex of the atrium (Fig. 129C) and the vulva (Fig. 16A, C, E) with the hyaline AD having broad anteromedian chamber and forming large lateral and posterolateral folds before joining HS.

DESCRIPTION. — See Griswold 1997a:63–65.

NATURAL HISTORY. — *Ulwembua ranomafana* occurs in montane rain forest.

DISTRIBUTION. — Known only from the type locality (Fig. 154).

MATERIAL EXAMINED. — MADAGASCAR: **Fianarantsoa**: Parc Nationale Ranomafana, Vohiparara, Piste Touristique, 21°14'S, 47°24'E, elev. 1000 m, 12 April 1998, C. Griswold, D. Kavanaugh, N. Penny, M. Raherilalao, J. Ranorianasoa, J. Schweikert and D. Ubick, (1♀ CASC), (same locality) elev. 1100 m, 7 December 1993, C. Griswold (♂ holotype and ♀ paratype CASC).

Ulwembua usambara new species
Figures 2B, C; 125C; 130A–C; 131A–D; 132A–C; 133E; 154

TYPES. — Male holotype and female paratype from Mazumbai, West Usambara Mts., Muheza District, Tanga Region, Tanzania, 20 November 1995, C. Griswold, deposited in CASC.

ETYMOLOGY. — A noun in apposition, referring to the type locality.

DIAGNOSIS. — Males are distinguished from all other *Ulwembua* except *U. pulchra* and *U. denticulata* by having the C subbasal and the MLT narrow (Fig. 132A), and from these species by having the C relatively narrow (length > 1.70 × width) (Fig. 131D) and the PC notch broad (distance between tips of RMP and PC > 2 × RMP length) (Fig. 132B); females by the character combination of the epigynal atrium extending anteriad of S (Fig. 125C), carapace orange-brown to dark red-brown, lacking clearly-defined dorsal light mark, and abdomen tapering posteriorly (Fig. 130B, C).

MALE (holotype). — Total length 2.85. Carapace, clypeus and chelicerae dark red-brown, carapace dusky along lateral margin, at thoracic fovea, and forming faint longitudinal band on pars cephalica, ocular area with black surrounding AME and lateral eyes and extending back from AME nearly to PME (Fig. 130A); pedipalpal coxae dark grey-brown, labium and sternum dark brown; coxae, legs, and pedipalpi pale yellow-grey, unmarked except for dark patellae and dark apical annuli on leg femora and tibiae, cymbium grey; abdomen (Fig. 130A) dark grey, with faint dorsomedian yellow grey mark, weakly sclerotized from epigastric furrow to and surrounding petiole, weak sclerotization also surrounding spinnerets. Carapace 1.06 long, 0.67 wide, 0.34 high, granulate to denticulate posteriorly; PER 0.44 wide, AER 0.42 wide, OAL 0.19; ratio AME:ALE:PME:PLE, 1.75:1.40:1.00:1.40, PME diameter 0.05. Clypeus 0.19 high, chelicerae 0.33 long, with weak anterobasal protuberance. Sternum 0.55 long, 0.49 wide, strongly rugose; labium 0.11 long, 0.16 wide; pedipalpal coxae 0.18 long, 0.10 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.62 + 0.25 + 2.30 + 2.13 + 1.00 = [8.30]; II: 1.42 + 0.21 + 1.21 + 1.04 + 0.64 = [4.52]; III: 0.74 + 0.17 + 0.53 + 0.51 + 0.36 = [2.31]; IV: 1.15 + 0.19 + 0.85 + 0.70 + 0.45 = [3.34]; pedipalpus: 0.30 + 0.13 + 0.10 + (absent) + 0.46 = [0.99]. Palp with cymbial RMP small, acute, very short (Figs. 131A, 132B), PC narrow in lateral view; tegulum apex with embolic groove (Fig. 131C), MLT small, with small denticulate area; C simple, retromedian, longitudinal, E sinuate across tegular base (Figs. 131B; 132A, B).

VARIATION (N = 3). — Total length 2.46–2.85; ratios of carapace length/width 1.54–1.57, height/width 0.50–0.51; ratios of PER/OQP 2.93–3.00, PER/OAL 2.33–2.41, OQP/OQA 1.08–1.55, diameter AME/PME 1.56–2.00; ratios of clypeal height/diameter AME 2.57–3.17, cheliceral length/clypeal height 1.53–1.72; ratio of length femur I/carapace width 3.84–3.91.

FEMALE (paratype). — Total length 2.94. Structure and markings (Fig. 130B) as in male except chelicerae without basal protuberance and sclerotization not surrounding pedicel; abdomen light grey dorsally with pair of anteromedian dark longitudinal bands and posteromedian and posterior transverse dark marks. Carapace 0.89 long, 0.57 wide, 0.27 high; PER 0.39 wide, AER 0.37 wide, OAL 0.17; ratio AME:ALE:PME:PLE, 1.56:1.22:1.00:1.33, PME diameter 0.05. Clypeus 0.15 high, chelicerae 0.32 long. Sternum 0.49 long, 0.44 wide; labium 0.10 long, 0.18 wide; pedipalpal coxae 0.18 long, 0.10 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 1.66 + 0.21 + 1.42 + 1.28 + 0.74 = [5.31]; II: 1.17 + 0.19 + 0.89 + 0.81 + 0.59 = [3.65]; III: 0.57 + 0.13 + 0.42 + 0.40 + 0.34 = [1.86]; IV: 1.02 + 0.19 + 0.72 + 0.49 + 0.40 = [2.82]; pedipalpus: 0.21 + 0.08 + 0.13 + (absent) + 0.08 = [0.50]. Epigynum as in Figs. 125C, 132C; vulva as in Fig. 133E.

VARIATION (N = 4). — Total length 2.23–3.19; ratios of carapace length/width 1.53–1.58, height/width 0.41–0.56; ratios of PER/OQP 2.69–2.74, PER/OAL 2.18–2.47, OQP/OQA 1.00–1.04, diameter AME/PME 1.00–1.56; ratios of clypeal height/diameter AME 2.00–2.33, cheliceral length/clypeal height 1.86–2.14; ratio of length femur I/carapace width 2.85–3.00; carapace orange-brown to dark red-brown, base color of abdomen white to dark grey, relative size and intensity of light and dark markings on the carapace and abdomen vary (Fig. 130B, C).

NATURAL HISTORY. — *Ulwembua usambara* have been found in sheet webs (Fig. 2B, C) 1–2 m from the ground in forest understory.

DISTRIBUTION. — Uluguru and Usambara Mountains, Tanzania (Fig. 154).

ADDITIONAL MATERIAL EXAMINED. — TANZANIA: **Tanga**: West Usambara Mts., Mazumbai, elev. 1600–1800 m, 4°49′S, 38°30′E, 11–20 November 1995, C. Griswold, D. Ubick, and N. Scharff (1♂2♀ CASC 1♂3♀ ZMUC); **Morogoro**: Uluguru Mts., elev. 2100 m at Lukwangule West, 22 July 1981, N. Scharff and M. Stoltze (1♀ ZMUC).

Umwani, new genus

TYPE SPECIES. — *Umwani artigamos*, new species

ETYMOLOGY. — An arbitrary combination of letters; gender masculine.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — The *Umwani* autapomorphy is sclerotized cuticle surrounding the male pedicel (19:1). The embolic groove on the tegulum apex (28:1) suggests *Umwani* is the sister group of *Hanea* from New Zealand.

DIAGNOSIS. — Distinguished from all other cyatholipid genera except *Buibui*, *Cyatholipus*, *Hanea*, *Ilisoa*, *Lordhowea*, *Matilda*, and *Pokennips* by having the abdomen nearly round when viewed laterally (Fig. 134A, D), from *Cyatholipus*, *Ilisoa*, *Matilda*, and *Pokennips* in lacking coarse setae on the abdomen (Fig. 134B, F), and from *Buibui* by having the coxae surrounded by unsclerotized cuticle (Fig. 134C, E); males are distinguished from *Hanea* by having the C longitudinal and from *Lordhowea* by having the E origin apical (Fig. 136A, C); females are distinguished by having the vulva with large hyaline AD (Fig. 138B, D, E).

DESCRIPTION. — Total length 1.45–1.70. Carapace broadly oval in dorsal view (Fig. 134B, F), length 1.27–1.29 times width, profile evenly curved (Fig. 134A, D), maximum height 0.48–0.56 width; texture finely rugose, carapace posterior margin truncate; thoracic fovea shallow to deep oval and may have a small posterior pit; ocular area with PER width 1.94–2.36 times OAL, 2.44–2.54 times OQP, OQP 1.00–1.04 times OQA; diameter AME 1.00–1.44 times PME, distance PME–PLE 1.09–1.55 times PME diameter; clypeus high, height 2.14–3.00 times AME diameter, cheliceral length 2.00–2.25 times clypeal height; chelicerae unmodified, promargin with 4 teeth, retromargin with 3. Sternum rugose, broad (Fig. 134E), length 0.80–0.91 times width, unsclerotized cuticle surrounds coxae (Fig. 134B, E). Abdomen round, sclerotized from epigastric furrow to pedicel in female and surrounding pedicel in male, not petiolate, abdomen otherwise unsclerotized; abdominal setae short, slender, bases of anterior setae slightly enlarged to form picks; the distribution of spigots cannot be determined with certainty through light microscope examination of the unique female: the apex of the female PLS appear to have three closely spaced, slender spigots, which may comprise the araneoid triplet of one flagelliform and two aggregate gland spigots, suggesting that the spinnerets are typical of Cyatholipidae. Legs very short, femur I length 1.20–1.31 times carapace width, unmodified, leg formula 1243. Male palpus with cymbial RMP pointing ventrad (Fig. 137D), smaller than PC; palpal bulb (Fig. 136A–C, E) with dentate MLT, apex convex, smooth; C median, longitudinal, simple, smooth; E thick, making simple curve, origin apical at between 12–1 o'clock, smooth, simple; PEP absent. Epigynum (Fig. 136D) with S and MH with broad septum between CO, ML parallel-sided. Vulva (Fig. 138B, D, F) with large, simple hyaline AD, FD posterior.

COMPOSITION. — Two species.

NATURAL HISTORY. — See each species below.

DISTRIBUTION. — East Africa (Eastern Arc mountains of northern Malawi and southern Tanzania) (Fig. 152).

Umwani anymphos, new species

Figures 134D–F; 135A–C; 136A, B; 152

TYPES. — Male holotype from an elevation of 2325 m in Mwenembwe Forest on Nyika Plateau, Malawi, collected 17 December 1981 by R. Jocqué, deposited in MRAC.

ETYMOLOGY. — Greek, unmarried, without bride.

DIAGNOSIS. — Distinguished from *U. artigamos* by having the femora with dark basal annuli, III and IV becoming pale yellow-white distally, and the apex of tegulum convex, with the embolic groove shallow (Figs. 135A, 136A); female unknown.

MALE (holotype). — Total length 1.68. Carapace (Fig. 134D–F), chelicerae, and pedipalpal coxae dark red-brown, labium and sternum dark brown, unmarked; coxae, trochanters, and proximal segments of pedipalpi yellow-white, cymbium red-brown; leg femora with dark gray basal annuli, legs I and II with middle of femora yellow-white, apex of femora to tarsi yellow-brown, legs III and IV yellow-white on apices of femora and patellae, tibiae-tarsi yellow-brown; abdomen dark gray, dorsum (Fig. 134F) with three transverse white marks that curve anteriorly at sides, anterior two united in center, posterior separate. Carapace 0.79 long, 0.61 wide, 0.29 high; PER and AER 0.37 wide, OAL 0.19; ratio

AME:ALE:PME:PLE, 1.00:1.20:1.00:1.40, PME diameter 0.05. Clypeus 0.16 high, chelicerae 0.31 long. Sternum 0.42 long, 0.46 wide; labium 0.08 long, 0.16 wide; pedipalpal coxae 0.15 long, 0.11 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 0.81 + 0.21 + 0.68 + 0.64 + 0.51 = [2.85]; II: 0.74 + 0.20 + 0.59 + 0.55 + 0.49 = [2.57]; III: 0.53 + 0.17 + 0.36 + 0.38 + 0.34 = [1.78]; IV: 0.66 + 0.19 + 0.49 + 0.45 + 0.32 = [2.11]; pedipalpus: 0.23 + 0.08 + 0.06 + (absent) + 0.26 = [0.63]. Palp with cymbial RMP short, apex rounded (Fig. 135C); tegulum (Figs. 135A, B; 136A, B) apex convex, embolic groove shallow; C smooth.

FEMALE. — Unknown.

NATURAL HISTORY. — The type specimen was taken in a clearing near the forest edge, in *Selaginella*.

DISTRIBUTION. — Known only from the type locality in northern Malawi (Fig. 152).

MATERIAL EXAMINED. — Only the type.

Umwani artigamos, new species
Figures 134A–C; 136C–E; 137A–C; 138B, D, F; 152

TYPES — Male holotype and female paratype from montane rainforest at an elevation of 1600 m in Chita Forest above Chita Village in the Uzungwa Mts., Morogoro Region, Tanzania, collected 10 November 1984 by N. Scharff, deposited in ZMUC.

ETYMOLOGY. — Greek, just married.

DIAGNOSIS. — Distinguished from *U. anymphos* by having the femora pale basally (Fig. 134A) and the male palpal bulb having the tegulum with a deep retroapical embolic groove (Figs. 136C; 137B, C).

MALE (holotype). — Total length 1.45. Carapace (Fig. 134B) dark red-brown, unmarked except dark gray around and between AME; chelicerae and pedipalpal coxae red-brown, labium and sternum dark brown (Fig. 134C); coxae, trochanters and proximal segments of pedipalpi yellow-white, cymbium dark red-brown, legs (Fig. 134A) yellow-brown from femur apex to tibia, distally red-brown, unmarked; abdomen dark gray, dorsum with yellow-white forming anterior diamond-shaped spot connected narrowly to medial transverse band that curves anteriad at sides. Carapace 0.74 long, 0.58 wide, 0.29 high, thoracic fovea shallow oval with deep posterior pit; PER and AER 0.35 wide, OAL 0.16; ratio AME:ALE:PME:PLE, 1.22:1.33:1.00:1.22, PME diameter 0.05. Clypeus 0.14 high, chelicerae 0.28 long. Sternum 0.37 long, 0.40 wide; labium 0.09 long, 0.14 wide; pedipalpal coxae 0.15 long, 0.10 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 0.70 + 0.18 + 0.57 + 0.53 + 0.42 = [2.40]; II: 0.62 + 0.16 + 0.47 + 0.45 + 0.40 = [2.10]; III: 0.40 + 0.14 + 0.30 + 0.30 + 0.28 = [1.42]; IV: 0.57 + 0.16 + 0.40 + 0.34 + 0.32 = [1.79]; pedipalpus: 0.24 + 0.10 + 0.08 + (absent) + 0.31 = [0.73]. Palp with cymbial RMP short, pointed, PC a narrow hook in lateral view (Fig. 137D); tegulum (Figs. 136C, E; 137A–C) apex low, with narrow ridge forming margin of retroapical embolic groove, MLT with small oval denticulate patch; C with a few teeth on lower inside margin.

FEMALE (paratype). — Total length 1.59. Markings and structure as in male except yellow-white dorsal markings of abdomen more extensive, forming anterodorsal light spot encompassing two faint dark spots, thoracic fovea a broad shallow oval. Carapace 0.75 long, 0.58 wide, 0.33 high; PER 0.35 wide, AER 0.34 wide, OAL 0.15; ratio AME:ALE:PME:PLE, 1.44:1.22:1.00:1.22, PME diameter 0.05. Clypeus 0.15 high, chelicerae 0.33 long. Sternum 0.35 long, 0.43 wide; labium 0.09 long, 0.16 wide; pedipalpal coxae 0.16 long and wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 0.72 + 0.19 + 0.53 + 0.51 + 0.47 = [2.42]; II: 0.59 + 0.19 + 0.45 + 0.42 + 0.40 = [2.05]; III: 0.38 + 0.17 + 0.28 + 0.30 + 0.30 = [1.43]; IV: 0.57 + 0.17 + 0.40 + 0.36 + 0.32 = [1.82]; pedipalpus: 0.18 + 0.09 + 0.09 + (absent) + 0.21 = [0.57]. Epigynum as in Figure 136D, vulva (Fig. 138B, D, F) with AD that extends anteriad as a simple, broad chamber, 4 times as large as HS, with a posterolateral side chamber curving around ventrally to enter the HS anterolaterally.

NATURAL HISTORY. — Unknown.

DISTRIBUTION. — Known only from the type locality in southwestern Tanzania (Fig. 152).

MATERIAL EXAMINED. — Only the types.

Uvik, new genus

TYPE SPECIES. — *Uvik vulgaris*, new species.

ETYMOLOGY. — An anagram of Kivu, a district in eastern Congo D. R.

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Uvik* autapomorphies are the anvil-shaped PEP (41:3) and hemispherical vulval AD that are at least twice as large as the HS (46:1); the sclerotized cuticle surrounding the male pedicel (19:1) and PEP lacking basal teeth (43:0) suggest that this monotypic genus is the sister group of a clade containing *Wanzia*, *Isicabu*, and *Scharffia* from Africa and *Alaranea* from Madagascar.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Vazaha*, and *Wanzia* by having the abdomen triangular when viewed laterally (Fig. 139A), from *Kubwa*, *Pembatatu*, *Teemenaarus*, *Ubacisi*, *Ulwembua*, and *Vazaha* by having sclerotizations surrounding the coxae (Fig. 139A, B), from *Alaranea*, *Scharffia*, *Teemenaarus*, and *Wanzia* in lacking an abdominal petiole (Fig. 139A), and from *Isicabu* in having the carapace oval in dorsal view and evenly curved in profile (Fig. 139B). Males are distinguished from *Buibui* and *Tekellatus* by having the PEP small, smooth, and hammer-shaped (Fig. 140D); females from these genera by having sclerotized, hemispherical vulval AD twice as large as the HS (Fig. 138A, C, E).

DESCRIPTION. — See under species description below; total length 2.30–3.25; leg formula 1243; spinnerets typical (Figs. 10A–D, 11A–D).

COMPOSITION. — One species.

NATURAL HISTORY. — See under species below.

DISTRIBUTION. — Uplands along southern Albertine Rift between Lake Albert and Lake Tanganyka (Fig. 157).

Uvik vulgaris, new species

Figures 10A–D; 11A–D; 14C; 138A, C, E; 139A–C; 140A–D; 141A–C; 142A–C; 157

TYPES. — Male holotype from Congo D. R., Kivu, Volcan Nyiragongo, Shaheru, elev. 2650 m, 18August 1970, R. P. M. Lejeune, deposited in MRAC. Paratypes, 17 males and 28 females, same data, 14 males and 24 females in MRAC, 3 males and 4 females in CASC.

ETYMOLOGY. — Latin, common, abundant.

DIAGNOSIS. — By the characters of the genus.

MALE (holotype). — Total length 2.87. Carapace red-brown (Fig. 139A), faintly mottled with black on pars thoracica and with narrow dark stripe anteriad of thoracic fovea, pars cephalica lighter than pars thoracica, black surrounding AME, PME, and lateral eyes, clypeus, chelicerae, pedipalpal coxae, and labium orange-brown, sternum red-brown; coxae and trochanters yellow-white, legs orange-brown, bases of femora, sides of patellae, and bases of tibiae and metatarsi yellow-white, pedipalpi yellow-white except cymbium red-brown; abdomen pale grey, with dorsomedian dark chevrons and longitudinal lateral dark grey bands meeting posteriorly, venter brown between epigastric furrow to and surrounding pedicel, dark grey posteriorly. Carapace 1.24 long, 0.84 wide, granulate, oval in dorsal view, 0.45 high, profile evenly curved, weakly concave posteriorly, thoracic fovea a deep oval; PER 0.48 wide, AER 0.47 wide, OAL 0.20; ratio AME:ALE:PME:PLE, 1.33:1.00:1.17:1.17, PME diameter 0.07. Clypeus 0.22 high, chelicerae 0.38 long; promargin with 4 teeth, retromargin with 3. Sternum 0.68 long, 0.62 wide, rugose; labium 0.16 long, 0.22 wide; pedipalpal coxae 0.25 long, 0.16 wide; lateral sclerotizations meet between coxae. Legs unmodified; measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.45 + 0.32 + 2.19 + 1.68 + 0.94 = [7.58]; II: 1.94 + 0.32 + 1.72 + 1.34 + 0.84 = [6.16]; III: 1.00 + 0.23 + 0.83 + 0.70 + 0.49 = [3.25]; IV: 1.28 + 0.25 + 1.06 + 0.83 + 0.51 = [3.93]; pedipalpus: 0.40 + 0.16 + 0.09 + (absent) + 0.42 = [1.07]. Abdomen trapezoidal (Fig. 139A), sclerotized only between epigastric furrow to and surrounding pedicel, not petiolate, with fine setae only. Palp with cymbial RMP conical (Figs. 140B, 141B), PC evenly curved in lateral view; tegulum (Figs. 140A–C; 141A, B) apex a low, smooth lobe, MLT one-half width of tegulum, denticulate patch covering two thirds of length; reservoir with curlicue near embolic base (Fig. 14 C); C bipartite, inner margin fimbriate proximally, lower process slender; E arising at 2 o'clock, base smooth, PEP small, smooth, hammer- or anvil-shaped (Fig. 140D).

VARIATION (N = 7). — Total length 2.72–3.25; ratios of carapace length/width 1.47–1.59, height/width 0.45–0.70; ratios of PER/OQP 2.30–2.61, PER/OAL 2.24–2.47, OQP/OQA 1.00–1.12, diameter AME/PME 1.00–1.23; ratios of clypeal height/diameter AME 1.75–2.57, cheliceral length/clypeal height 1.71–2.86; ratio of length femur I/carapace width 2.87–7.06. Intensity and relative extent of light and dark abdominal makings vary; chelicerae may have a weak basal protuberance; PEP may be smooth or covered with pustules.

FEMALE (paratype). — Total length 2.70. Markings and structure (Fig. 139B, C) as in male. Carapace 1.22 long, 0.74 wide, 0.38 high; PER 0.46 wide, AER 0.44 wide, OAL 0.18; ratio AME:ALE:PME:PLE, 1.33:1.00:1.17:1.17, PME diameter 0.07. Clypeus 0.14 high, chelicerae 0.39 long. Sternum 0.60 long, 0.56 wide; labium 0.15 long, 0.21 wide; pedipalpal coxae 0.25 long, 0.15 wide. Leg measurements (Femur + Patella + Tibia + Metatarsus + Tarsus = [Total]): I: 2.12 + 0.30 + 1.72 + 1.30 + 0.87 = [6.31]; II: 1.62 + 0.28 + 1.40 + 1.04 + 0.74 = [5.08]; III: 0.85 + 0.23 + 0.64 + 0.59 + 0.47 = [2.78]; IV: 1.13 + 0.23

+ 0.87 + 0.66 + 0.47 = [3.33]; pedipalpus: 0.28 + 0.11 + 0.16 + (absent) + 0.39 = [0.94]. Epigynum as in Figs. 141C, 142A–C, anterior margin of atrium confluent with S, MS narrow; vulva as in Fig. 138A, C, E; AD sclerotized, hemispherical, twice as large as HS.

VARIATION (N = 5). — Total length 2.30–2.81; ratios of carapace length/width 1.38–1.66, height/width 0.48–0.55; ratios of PER/OQP 2.27–2.56, PER/OAL 2.28–2.59, OQP/OQA 1.00–1.09, diameter AME/PME 1.09–1.18; ratios of clypeal height/diameter AME 1.57–2.00, cheliceral length/clypeal height 2.54–2.64; ratio of length femur I/carapace width 2.54–3.56. Intensity and relative extent of light and dark abdominal markings vary; sclerotization may not surround pedicel in weakly sclerotized individuals.

NATURAL HISTORY. — *Uvik vulgaris* occur at elevations from 2000–3500 m. Individuals were swept from understory vegetation in montane rainforest at Ruhizha in Bwindi-Impenetrable National Park.

DISTRIBUTION. — Uplands along southern Albertine Rift between Lake Albert and Lake Tanganyka (Fig. 157).

ADDITIONAL MATERIAL EXAMINED. — CONGO D. R.: **Kivu**: Volcan Karisimbi, Rukumi, elev. 3500 m, 23 July 1970, R. P. M. Lejeune (32♂52♀ MRAC 3♂4♀ CASC); Volcan Karisimbi, Rukumi, elev. 3700 m, 14 July 1970, R. P. M. Lejeune (37♂34♀ MRAC); Mt. Lubwe, S-E de Butembo, elev. 2380 m, 13 April 1970, R. P. M. Lejeune (1♀ MRAC), Mt. Lubwe, S-E de Butembo, elev. 2040 m, 12 April 1971, R. P. M. Lejeune (1♀ MRAC); Kambaila valleé, Tantaaliritanda, June 1973, R. P. M. Lejeune (1♀ MRAC), Itombwe, terr. de Uvira, elev. 2500 m, August 1959, N. Leleup (1♂ MRAC); Ruwenzori, Bujuku Valley, Bigo, Svenska Östafrikaexp. 1948, all collected by Å. Holm (ZMUU), elev. 3500 m, 1 April 1948 (1♀), 21 March 1948 (1♀), 31 March 1948 (1♂1♀), elev. 3500–3700 m, 1 April 1948 (1♂2♀); W. Ruwenzori, Kalonge, elev. 2050 m, August 1934, C. Burgeon (1♂ MRAC); N. face du Ruwenzori, camp de Kanzuiri, elev. 3400–3500 m, July–August 1974, R. P. M. Lejeune (1♂2♀ MRAC), N. face du Ruwenzori, entre Senguye et Karibumba, elev. 3800 m, July–August 1974, R. P. M. Lejeune (1♀ MRAC), N. face du Ruwenzori, camp de Kanzuiri, Karibumba, July–August 1974, R. P. M. Lejeune (1♀ MRAC), camp de Kanzuiri, crête du Kanzuiri, elev. 3500 m, R. P. M. Lejeune (2♀ MRAC). UGANDA: **Kabale**: Ruhizha, Bwindi-Impenetrable National Park, elev. ca. 2300 m, ca. 1°02′S, 29°47′E, forest, 13–16 September 1996, C. E. Griswold (2♀ CASC).

Vazaha **Griswold, 1997**

Vazaha Griswold 1997a:65 (type species, by original designation, *Vazaha toamasina* Griswold 1997, from central Madagascar).

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Vazaha* autapomorphies are the protuberance at the base of the male chelicera (16:1) and the form of palpal bulb. This enigmatic and primitive monotypic genus shares a number of derived features, i.e., carapace texture granulate (12:1), PC larger than cymbial RMP (26:0), tegulum apex with an apical lobe (28:2), a tegular median lobe (29:1), embolus origin shifted distad to at least near 3 o'clock (35:1), pars pendula extending for most of embolus length (37:1), and epigynal scape (52:1), with a diverse group of 18 genera from Africa, Madagascar, New Zealand, and Australia.

DIAGNOSIS. — Distinguished from all other cyatholipid genera by having the female epigynum with S but lacking MH (Figs. 145B, 146A–C), and the male palp with cymbial RMP directed distad (Fig. 144D); E thick, lacking PEP (Fig. 145A).

DESCRIPTION. — Total length 2.21–2.81. Carapace oval in dorsal view, length 1.43–1.60 times width, profile evenly curved (Fig. 143); maximum height 0.43–0.51 width, finely rugose, posterior margin weakly concave, thoracic fovea a shallow oval; ocular area with PER width 2.11–2.17 times OAL, 2.53–2.76 times OQP, OQP 0.87–1.07 times OQA; diameter AME 1.00–1.45 times PME, distance PME–PLE 1.17–1.50 times PME diameter; clypeal height 1.25–2.50 times AME diameter, cheliceral length 2.93–4.00 times clypeal height, anteriad-directed basal projection large in male (Fig. 143), smaller in female; promargin of fang furrow with 4 teeth, retromargin with 3. Sternum finely granulate, length 1.10–1.15 times width, coxae surrounded by unsclerotized cuticle. Abdomen triangular (Fig. 143), weakly sclerotized between epigastric furrow and pedicel, not petiolate; abdominal setae fine, bases of anterior setae slightly enlarged as picks; spinnerets typical. Legs long, unmodified, femur I 3.22–3.81 times carapace width; leg formula 1243. Male palpus with cymbial RMP short (Fig. 144D), narrow, directed distad, PC broad and blunt in lateral view; tegulum (Figs. 144A–C; 145A, C) apex a small, pointed lobe, MLT pointed, weakly wrinkled; C a distal, simple, elongate, basad-directed triangle; E stout, arising at near 2 o'clock, PEP absent. Epigynum (Figs. 145B, 146A–C) with S but lacking MH; vulva (Fig. 133F, G) with CO leading directly to large, sclerotized HS, AD absent; FD posterior.

COMPOSITION. — One species.

NATURAL HISTORY. — See under species below.

DISTRIBUTION. — Madagascar (Fig. 155).

Vazaha toamasina Griswold, 1997
Figures 133F, G; 143; 144A–D; 145A–C; 146A–C; 155

Vazaha toamasina Griswold 1997a:65 (♂ holotype from Parc National Perinét, Madagascar, CASC type #17338, examined).

DIAGNOSIS. — See generic diagnosis above.

DESCRIPTION. — See Griswold (1997a:65–67).

NATURAL HISTORY. — *Vazaha toamasina* occur in moist montane forest.

DISTRIBUTION. — Known only from the type locality on the eastern escarpment in central Madagascar (Fig. 155).

MATERIAL EXAMINED. — MADAGASCAR: **Toamasina:** Parc National Perinét, near Andasibe, 18°56′S, 48°24′E, elev. 1000 m, 4–5 November 1993, C. Griswold (♂ holotype, ♀ paratype, and 1♀ CASC).

Wanzia Griswold, 1998

Wanzia Griswold 1998a:123 (type species, by original designation, *W. fako* Griswold 1998, from Cameroon).
Isicabu, Griswold et al. 1998:9 (not *Isicabu* Griswold 1987c).

MONOPHYLY AND PHYLOGENETIC PLACEMENT. — *Wanzia* autapomorphies are the sclerotized PEP (41:0), tubular vulval AD form (45:0), epigynal atrial furrows that extend anteriad of the scape (55:1) and unique pattern of abdominal sclerotization; the female abdominal petiole (20:1) is a synapomorphy suggesting *Wanzia* is the sister group of a clade containing *Isicabu*, *Scharffia* and *Alaraea*.

DIAGNOSIS. — Distinguished from all cyatholipid genera except *Alaranea*, some *Buibui*, *Isicabu*, *Kubwa*, *Pembatatu*, *Scharffia*, *Tekellatus*, *Teemenaarus*, *Toddiana*, *Ubacisi*, *Ulwembua*, *Uvik*, and *Vazaha* by having the abdomen triangular when viewed laterally (Fig. 147), from *Kubwa*, *Pembatatu*, *Teemenaarus*, *Tekellatus*, *Ubacisi*, *Ulwembua*, and *Vazaha* by having sclerotizations surrounding the coxae (Fig. 4G), from *Alaranea* and *Scharffia* in lacking an annulate petiole, and from *Isicabu* in having the carapace oval in dorsal view and evenly curved in profile (Fig. 147). Males are distinguished from *Buibui*, *Toddiana*, and *Uvik* by having the E surface fimbriate near the PEP base and the PEP fleshy with a sclerotized base (Fig. 148D), and females from these genera by having atrial furrows of the epigynum (Fig. 149C) extending anteriad of S and the vulva (Fig. 16B, D, F) with AD reduced, and the HS large, thick and heavily sclerotized.

DESCRIPTION. — Total length 1.87–2.81. Carapace oval in dorsal view (Griswold 1998a, fig. 2), length 1.32–1.49 times width, profile evenly curved (Fig. 147), maximum height 0.54–0.68 width; texture finely rugose, posterior margin truncate to weakly concave; thoracic fovea a deep oval; ocular area with PER width 2.04–2.45 times OAL, 2.10–2.59 times OQP, OQP 0.94–1.19 times OQA; diameter AME 0.93–1.67 times PME, distance PME–PLE 1.08–1.67 times PME diameter; clypeal height 1.76–3.69 times AME diameter, cheliceral length 1.18–2.27 times clypeal height; promargin of fang furrow with 4 teeth, retromargin with 3 (Fig. 5B). Sternum rugose (Fig. 4G), length 0.87–1.10 times width, coxae surrounded by sclerotized cuticle. Abdomen triangular, with dark brown sclerotizations extending from epigastric furrow to form a short petiole surrounding pedicel, sclerotization surrounding spinnerets and covering posterodorsal apical point, abdominal markings comprise mottling with large, dark maculations, between these guanine forms white patches beneath cuticle (Fig. 147); abdomen with scattered fine setae, anterior setal bases not enlarged; spinnerets typical. Legs long, unmodified, femur I 1.91–2.26 times carapace width in female, 2.46–4.50 in male, leg formula 1243. Male palpus with cymbial RMP broad, blunt, bifid, pointing ventrad, smaller than PC (Figs. 148A, 149B), PC deeply curved in lateral view, tegulum (Figs. 148A–C, 149A, B) apex smooth, MLT lacking denticulate patch; C with basal margin of cup fimbriate, with minute secondary process; E broad, arising near two o'clock, base with deep grooves, surface fimbriate near PEP base, PEP fleshy with sclerotized base, complexly folded, with pustules (Fig. 148D); reservoir with curlicue near embolic base (Griswold et al. 1998, fig. 19a). Epigynum (Fig. 149C) with S and MH, atrial furrows extend anteriad of S; median lobe trapezoidal, widest posteriorly; vulva (Fig. 16B, D, F) with AD reduced, HS large, thick, heavily sclerotized; FD posterior.

COMPOSITION. — One species.

NATURAL HISTORY. — See under species below.

DISTRIBUTION. — Highlands of western Cameroon and neighboring island of Bioko (Fig. 152).

Wanzia fako Griswold, 1998
Figures 3A, B, E; 4G; 5A–D; 16B, D, F; 147; 148A–D; 149A–C; 152

W. fako Griswold 1998a:125 (holotype ♂ from Mann's Spring, Mt. Cameroon, Cameroon, CASC, examined).
Isicabu, Griswold et al. 1998:9 (not *Isicabu* Griswold 1987c).

DIAGNOSIS. — Disinguished by the characters of the genus; also the blunt, bifid cymbial RMP (Fig. 149B), embolic villi basad of the PEP (Griswold 1998a, fig. 7), and vulva (Fig. 16B, D, F) with large, heavily sclerotized HS served by very short copulatory ducts are unique in the family and presumably autapomorphic for the genus.

DESCRIPTION. — See Griswold (1998a:123–129).

NATURAL HISTORY. — Typical webs (Griswold 1998a, fig. 18; Griswold et al. 1998, figs. 5a,c) occur in both woody and herbaceous understory vegetation in shaded areas in moist forests between the elevations of 800–2500 m (Fig. 3A, B, E), where they may be abundant (Griswold 1998a:129).

DISTRIBUTION. — Volcanic mountains and Bamenda Highlands of western Cameroon and Bioko Island (Fig. 152).

MATERIAL EXAMINED. — CAMEROON: **Southwest**: Fako Division: Mt. Cameroon: mist forest on south side, elev. 1425 m, 4°06′28″N; 9°07′10″E, 26–28 January 1992, C. Griswold, J. Coddington, G. Hormiga, S. Larcher (1♂4♀ USNM 2♂4♀ CASC); elev. 1850 m, 2 June 1956, K. Byström (1♂ ZMUU); Mapanja, elev. 1200 m, montane forest, 19 March 1983, Bosmans and Van Stalle (2♂1♀ MRAC); Buea, hut no. 1, elev. 1300 m, 16 February 1956, K. Byström (1♂ ZMUU); Buea Slope, elev. 1400–1500 m, 13–17 May 1949, B. Malkin (3♂2♀ CASC); near Buea, elev. 1200 m, meadow, 12 March 1981, Bosmans and Van Stalle (4♂1♀ MRAC); near Buea, elev. 1500 m, montane forest with ferndrees, 26 February 1987, Bosmans and Van Stalle (1♂ MRAC); near Buea, elev. 1800 m, montane forest with ferndrees, 27 February 1987, Bosmans and Van Stalle (1♀ MRAC); near Buea, elev. 2000 m, montane forest, sweepnet, 5 March 1981, Bosmans and Van Stalle (1♂ MRAC); near Buea, clearing in montane forest, elev. 1900 m, 5 March 1981, Bosmans and Van Stalle (1♀ MRAC); forest near Mann's Spring, elev. 2050 m, 4°08′N; 9°07′E, 21–25 January 1992, C. Griswold, J. Coddington, G. Hormiga, S. Larcher (♂ holotype ♀ paratype CASC) (15♂23♀ CASC, 15♂100♀ USNM). Meme: Mt. Kupe above Nyassosso, forest, elev. 800–1200 m, 4°50′N; 9°41′E, 16–19 February 1992, C. Griswold, N. Scharff, C. Wanzie, S. Larcher, P. Masongo (16♂20♀ CASC, 28♂23♀ ZMUC, 27♂47♀ USNM). **Northwest**: Menchum: forest near Lake Oku, elev. ca. 2150 m, 6°12′N; 10°27′E, 7–13 February 1992, C. Griswold, N. Scharff, C. Wanzie, S. Larcher (24♂46♀ CASC, 12♂40♀ USNM, 13♂57♀ ZMUC); Mt. Oku, *Podocarpus*/*Arundinaria* forest, elev. ca. 2450 m, 6°12′52″N; 10°29′53″E, 14 February 1992, C. Griswold, N. Scharff, C. Wanzie, S. Larcher, B. Menzepoh, S. Tame (1♂2♀ CASC, 2♂3♀ USNM, 3♂1♀ ZMUC). EQUATORIAL GUINEA: **Bioko**: Moka, 3°22′0″N, 8°39′57″E, elev. 1500 m, beating and sweeping forest vegetation, 6–10 October 1998, K. Dabney and D. Ubick (1♀ CASC).

Biogeography

Distribution of genera and species. Cyatholipidae occur in Australia, New Zealand, and the Afrotropical region (Fig. 150). Records from Jamaica (*Pokennips dentipes*) and northern Europe (the fossil *Succinilipus* and *Spinilipus*) are too uncertain to be considered further.

The Australian genera are all monotypic and each is recorded from a single locality, though undescribed material suggests that at least *Matilda*, *Teemenaarus* and *Toddiana* may be speciose and widespread in eastern Australia. The New Zealand genera *Tekella* and *Tekelloides* each comprise several species and are distributed in both North and South Island. *Hanea* is known only from the type locality on the northern end of South Island, New Zealand.

The Afrotropical fauna comprises fifteen genera. Two (*Alaranea* and *Vazaha*) are endemic to Madagascar, one (*Ulwembua*) occurs in both Africa and Madagascar, and the remaining twelve (*Buibui*, *Cyatholipus*, *Ilisoa*, *Isicabu*, *Kubwa*, *Pembatatu*, *Pokennips*, *Scharffia*, *Ubacisi*, *Umwani*, *Uvik* and *Wanzia*) occur only in Africa. Four genera (*Cyatholipus*, *Ilisoa*, *Pokennips*, and *Ubacisi*) are restricted to Africa south of the Limpopo, and three of these (*Ilisoa*, *Pokennips*, and *Ubacisi*) occur only in the Cape region west of the Uitenhage Basin and Algoa Bay. Seven genera (*Buibui*, *Kubwa*, *Pembatatu*, *Scharffia*, *Umwani*, *Uvik* and *Wanzia*) occur only in tropical Africa.

Alaranea occur along the moist eastern escarpment of Madagascar (Fig. 155). Three species are known from single localities: *A. alba* from Beria in Toliara Province, *A. ardua* from the Marojejy Reserve in Antsiranana Province, and *A. betsileo* from Ranomafana in Fianarantsoa Province. *Alaranea merina* is the only widespread species, occurring in mid elevation forests along the eastern side of the Madagascar escarpment from the southern end of Antongil Bay south to the Andringitra Massif. It is sympatric with *A. betsileo* at Ranomafana. No phlyogenetic resolution is yet possible among the four known species.

Buibui occur in montane equatorial Africa from Cameroon to Kenya and north to Ethiopia, and all species are known from multiple localities (Fig. 151). Some cladistic resolution is possible in the genus. *Buibui abyssinica* and *B. cyrtata* are sister species. *Buibui abyssinica* occurs in central Ethiopia north of the Great Rift and *B. cyrtata* is known only from the Ruwenzori Mountains in D. R. Congo. Sister to these two species is *B. claviger*, which occurs in Kenya on Mount Kenya and in the Aberdares. The base of the *Buibui* clade is unresolved. This trichotomy involves the *abyssinica - claviger - cyrtata* clade (Ethiopia, Kenya and the Ruwenzoris), *B. orthoskelos* (uplands along the Albertine Rift in the Kivu region of far eastern D. R. Congo), and *B. kankamelos* (central Africa on Mt. Cameroon and Bioko Island). All *Buibui* species appear to be allopatric.

Cyatholipus are exclusively South African (Fig. 158). Specimens are rare, and each species is known from a single, allopatric locality. Little cladistic resolution is possible at present. Unique features of the male and female genitalia suggest that the species *C. icubatus* (Zululand), *C. isolatus* (Soutpansberg Mountains in extreme northern South Africa), and *C. tortilis* (Drakensberg Mountains in KwaZulu-Natal) form a clade occurring in northeastern South Africa. Relationships of the remaining species are unresolved: *C. avus* (Grootvadersbosch in the southwestern Cape region), *C. hirsutissimus* (Matjiesfontein in the western Karoo), and *C. quadrimaculatus* (Cape of Good Hope).

Ilisoa occur only in the Western Cape region of South Africa (Fig. 159). All species are allopatric, and very rare. No cladistic resolution is presently possible. Two species are known only from single specimens: *I. hawequas* (southwest Cape at Hawequas) and *I. knysna* (south central Cape at Diepwalle in the Knysna Forest). *Ilisoa conjugalis* is known from two localities on the Cape Peninsula.

Isicabu occur from KwaZulu-Natal in South Africa north to Tanzania (Fig. 153). They are fairly rare, and all except *I. zuluensis* and *I. kombo* are known from single localities. The cladogram of *Isicabu* is fully resolved and comprises sister clades in Tanzania and South Africa. *Isicabu henriki* and *I. margrethae* are sister species and occur in sympatry in the Uzungwa Mountains in Tanzania. Their sister species is *I. kombo* from the East and West Usambara Mountains, also in Tanzania. The South African clade comprises *I. reavelli*, known only from the Nkandla Forest in Zululand, and *I. zuluensis*, known from two localities in moist coastal and mid-elevation montane forests of Kwazulu-Natal.

Pembatatu occur only in a small area of East Africa between the Gregory and Albertine rifts (Fig. 157). The cladogram for the three species is resolved. The swollen male metatarsus I is a synapomorphy uniting *P. gongo* and *P. mafuta*. Each is known from a single locality in Kenya: *P. gongo* from Mount Kenya and *P. mafuta* from Mount Elgon. The sister group to this species pair, *P. embamba*, is widespread in both the old (Aberdares) and young (Kilimanjaro, Ngorongoro Crater) volcanic uplands along the Gregory Rift in Kenya and Tanzania.

Scharffia occur in East Africa from Malawi to Kenya (Fig. 156). Only *S. chinja* is widespread: the other three species are known from single localities. The cladogram is resolved. *Scharffia holmi* (Mount Elgon, Kenya) and *S. rossi* (Serengeti Plain, Tanzania) are sister species. Sister to these is *S. chinja* which occurs widely in the Eastern Arc mountains and nearby lowlands of Tanzania. Sister to this Kenya/Tanzania clade is *S. nyasa*, which is found only on Mt. Mulanje in Malawi.

The seven species of *Ulwembua* comprise the most widely distributed cyatholipid genus, occurring in southern and eastern Africa and Madagascar (Fig. 154). This distribution includes sister clades in Madagascar and in subtropical to tropical East Africa and a plesiomorphic species in the southern Cape. None appear to be sympatric. The Malagasy clade comprises three unresolved species: *U. antsiranana* from Montagne d'Ambre in far northern Madagascar, *U. nigra*, known from two collection records in the neighboring Marojejy and Anjanaharibe-Sud Reserves of north central Madagascar, and *U. ranomafana* from Ranomafana in south central Madagascar. Sister to this is an African clade of three unresolved species: *U. denticulata* occurs from warm subtropical Zululand north through the Transvaal Drakensberg mountains of Mpumalanga Province to the tropical Soutpansberg; *U. pulchra* is known only from the subtropical Dlinza Forest in Zululand; *U. usambara* occurs in the Uluguru and Usambara Mountains of Tanzania. The outgroup to this subtropical-tropical clade is *U. outeniqua*, which occurs widely in the Knysna Forest of the central Cape coast of South Africa.

Umwani comprise two species from the Eastern Arc mountains of East Africa (Fig. 152). Each species is known from a single collection: *U. anymphos* comes from the Mwenembwe Forest on Nyika Plateau in Malawi and *U. artigamos* comes from the Chita Forest in the Uzungwa Mts. of Tanzania.

The remaining six afrotropical genera are monotypic. *Kubwa* is known only from Mt. Kilimanjaro in Tanzania (Fig. 152); *Pokennips* probably is restricted to the western Cape of South Africa (Fig. 151), though its occurrence in Jamaica cannot be ruled out with certainty; *Ubacisi* is known only from Table Mountain, near Cape Town, South Africa (Fig. 152); *Uvik* occurs in the uplands along southern Albertine Rift between Lake Albert and

Lake Tanganyka (Fig. 157); *Vazaha* is known only from Perinét in east central Madagascar (Fig. 155); and *Wanzia* is known from Bioko Island and the volcanic mountains and Bamenda Highlands of western Cameroon (Fig. 152).

Biogeographic patterns. Cyatholipid spiders comprise part of an afromontane biota comprising sister groups disjunct among montane and cool-temperate forests in Africa and Madagascar. This distinct, homogeneous, and strikingly disjunct African forest biota has been recognized by many workers (Carcasson 1964; Feijen 1983; Griswold 1991; Moreau 1966; White 1978, 1983), but the use of altitudinal or other ecological criteria to define it has been questioned (Diamond and Hamilton 1980; Scharff 1992; Stuart et al. 1987). I define this biota in terms of the phylogenetic relationships among its component taxa rather than their ecology, the question being not whether a species occurs above or below a certain altitude, but whether there is a pattern of sister-group disjunctions among isolated mountains (Griswold 1991a; Griswold 2000). By this definition the African Cyatholipidae are afromontane.

A particularly striking feature of cyatholipid distribution is intercontinental vicariance between sister groups. Two cases of Madagascar-East Africa vicariance in the Cyatholipidae comprise disjunctions between *Alaranea* and *Scharffia* and the Malagasy (clade U) and East African (clade V) clades of *Ulwembua*. The sister group of the subtropical-tropical *Ulwembua* clade is *U. outeniqua*, which occurs widely in the Knysna Forest of the central Cape coast of South Africa. The sister group of *Alaranea - Scharffia* is *Isicabu*, which occurs widely in subtropical-tropical East Africa.

The two cases of Madagascar-East Africa vicariance in the Cyatholipidae mirror that found in the spider families Phyxelididae and Zorocratidae (Griswold et al. 1999). Within the Phyxelididae there are two (or possibly three) cases of Madagascar-East African montane vicariant sister group relationships (Griswold 1990; Griswold 2000). *Kulalania*, from montane East Africa, is the sister group of the Malagasy phyxelidid genus *Ambohima*. *Phyxelida* occurs in Madagascar and in East Africa from northernmost South Africa to Ethiopia, with an outlier species in the eastern Mediterranean. Two species are present in Madagascar: *P. fanivelona* Griswold is related to *P. bifoveata* (Strand) and *P. tanganensis* (Simon and Fage) from montane East Africa. The relationships of *P. malagasyana* to other *Phyxelida* are currently unresolved due to lack of data, but at least its affinities are to taxa from East Africa or from the Mediterranean or some subregion thereof. Among the Zorocratidae *Zorodictyna* Strand occurs in Madagacar: its sister group is *Raecius* Simon from montane tropical Africa (Griswold 1993, Griswold 2000).

Currently there are five (perhaps 6) cases of Madagascar-East African montane vicariant sister group relationships demonstrated for spiders: two within Cyatholipidae, one in Zorocratidae, and two (possibly three) in Phyxelididae. This corroborates the hypothesis in Griswold (1991) suggesting that Madagascar is related to areas in tropical East and South Africa, although the Mesozoic age suggested in that paper for this disjunction must be reevaluated. This tropical African-Madagascar vicariance pattern parallels that suggested for lemurs (Yoder et al. 1996) and tenrecs (Asher 1997). Recent molecular clock evidence suggests that the mammalian disjunctions may be Eocene in age (Yoder et al. 1996), and a land bridge along the Davie Fracture Zone has been postulated as a path for dispersal from Africa to Madagascar at this time (McCall 1997). Such an age and mechanism may also apply to the repeated biogeographic pattern among spiders.

The faunas of Australia and New Zealand are involved in a striking set of intercontinental disjunctions. The clade *Teemenaarus - Cyatholipus* presents a case of Australia - South Africa vicariance. There are also cases of New Zealand - Africa vicariance. *Hanea* is a possible sister group of *Umwani* and the New Zealand genera *Tekella* and *Tekelloides* nest within a predominantly African clade. On the other hand, there is no case of Australia - New Zealand sister group relationship. The affinities of the New Zealand genera to African taxa are well founded. The New Zealand sister genus pair *Tekella* - *Tekelloides* is separated from the cladistically nearest Australian taxon (*Teemenaarus*) by five well supported nodes (node [Bremer value]): Z (1), AA (1), BB (1), CC (1) and DD (2). The cladistic distance from the main Australian clade (clade II, comprising *Lordhowea*, *Matilda*, *Tekellatus* and *Toddiana*) is even greater: six well supported nodes (node [Bremer value]): Z (1), AA (1), BB (1), CC (1), EE (>2) and FF (>2). As would be expected with a data set in which more than half of the characters relate to the genitalia most synapomorphies supporting these nodes are genitalic. But somatic characters also play a part, e.g., at node T uniting African and New Zealand genera, at node II defining a clade of four Australian genera, and at node DD uniting Australian and African genera. The distinctness of the Australian and New Zealand cyatholipid faunas implied by the cladogram is well supported and may reflect the complex history of Gondwanaland and its biota.

The Future

Cyatholipidae comprise a disjunct afromontane and Gondwanan group of spiders. Our knowledge of this family has increased dramatically in the last 15 years but many mysteries remain. The New Zealand *Hanea* is still known from a single adult male, with the lack of female data clouding its phylogenetic affinities. The absence of any confirmed Cyatholipidae from South America is also mysterious, all the more so because the central Andes and Valdivian forests of Chile and Argentina have been well sampled. There may be a rich Australian fauna. Additional species may be discovered within Africa. Major mountain areas of Angola, the southern Congo basin and west Africa (i.e., Guinea, Côte d'Ivoire, Sierra Leone, and Liberia) are inadequately sampled. Given the current political instability in several of these areas discovery of new cyatholipids there is unlikely anytime soon. New species of rare genera (e.g., *Cyatholipus*) may hide even in well sampled areas like South Africa. Nevertheless, the review presented here serves to focus attention on this interesting spider clade and their preferred environment in the southern part of the world.

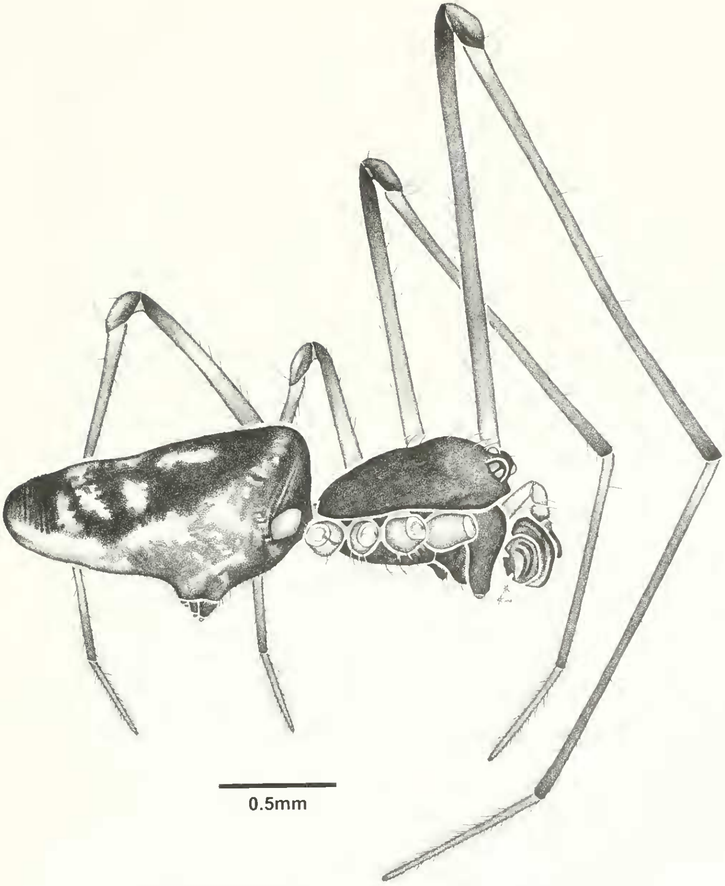


FIGURE 1. *Pembatatu embamba*, new species, ♂ from Cherangani. Illustration by JS.

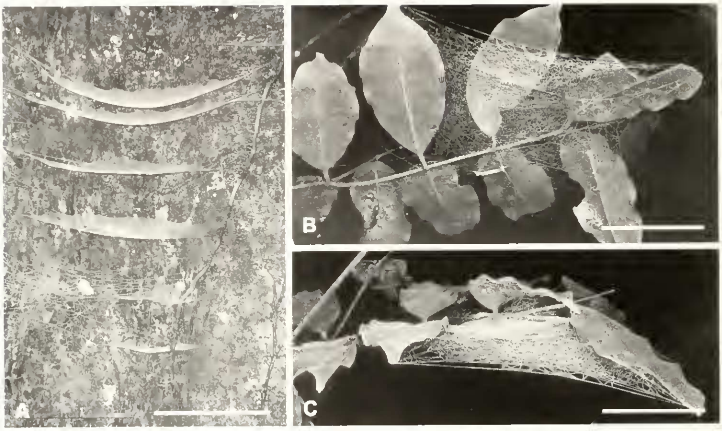


FIGURE 2. Cyatholipid webs from Usambara Mountains, Tanzania. A. Webs of *Scharffia chinja* Griswold from Amani on tree buttress (Scale bar = 10.0 cm); B, C. Web of *Ulwembua usambara*, new species from Mazumbai (Scale bars = 5.0 cm). B. From below. C. From side. Photographs by N. Scharff.

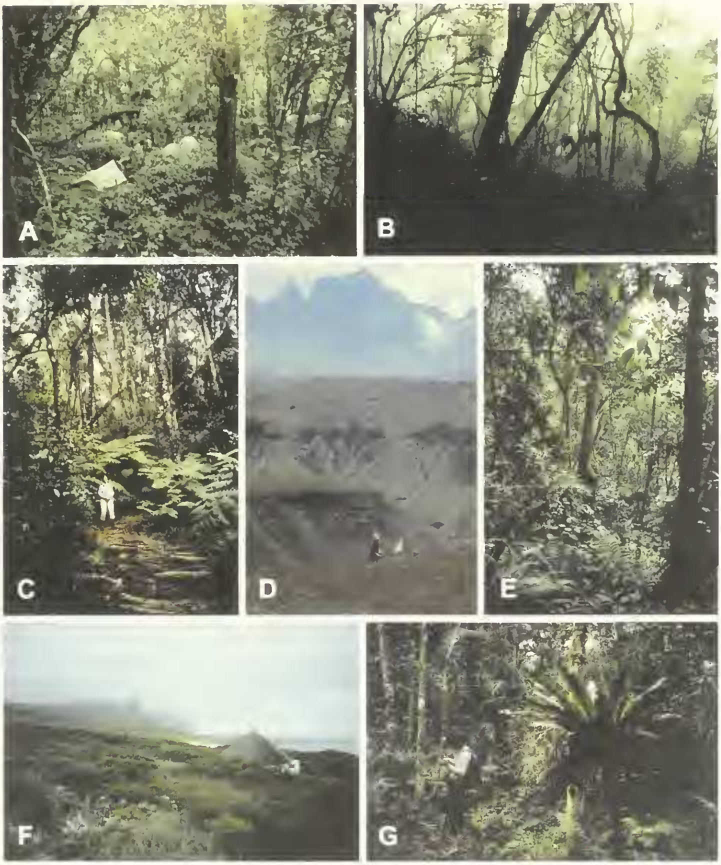


FIGURE 3. Habitats harboring African Cyatholipidae. A. Mist forest at 1400 m on Mt. Cameroon, Cameroon, January 1992, habitat of *Wanzia fako* Griswold. B. Forest at 2300 m at Mann's Spring on Mt. Cameroon, Cameroon, January 1992, habitat of *Wanzia fako* Griswold. C. Diepwalle at 500 m in Knysna Forest, South Africa, January 1985, habitat of *Ulwembua outeniqua* Griswold and *Ilisoa knysna* Griswold. D. Montane grassland at 1500 m near Cathedral Peak in Drakensberg Mountains of South Africa, February 1984, habitat of *Cyatholipus tortilis* Griswold. E. Forest at 1500 m on Mount Kupé, Cameroon, February 1992, habitat of *Wanzia fako* Griswold. F. Fynbos and coastal scrub at Buffels Bay, Cape Peninsula, South Africa, October 1985, habitat of *Ilisoa conjugalis*, new species, and *Pokennips dentipes* (Simon). G. Forest at 1100 m at Montagne d'Ambre, Madagascar, December 1993, habitat of *Ulwembua antsiranana* Griswold. Photographs by CG.

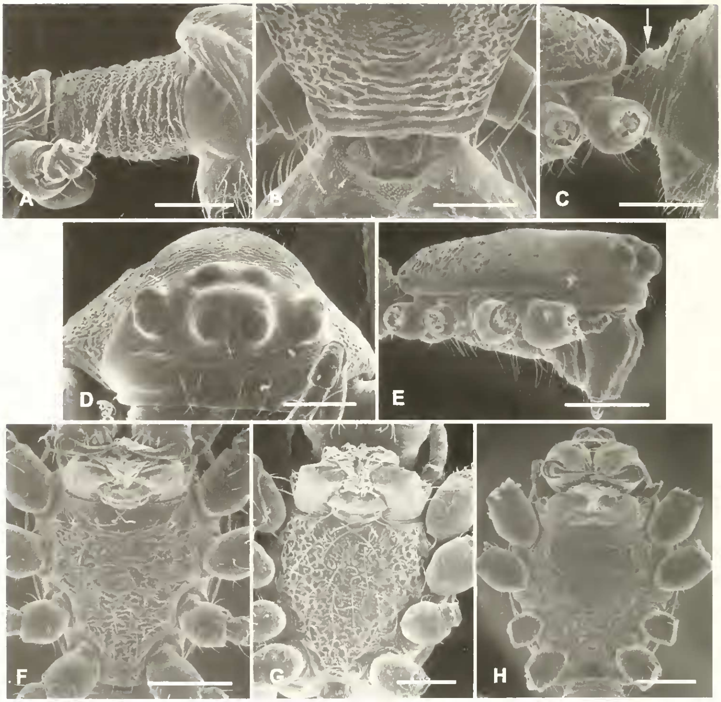


FIGURE 4. Morphology of Cyatholipidae. A. *Scharffia chinja* Griswold, ♀ from Mwanihana, elongate abdominal petiole, lateral. B. *Isicabu kombo*, new species, ♀ from Mbomole, Amani, posterior margin of carapace showing flared edge, dorsal. C. *Alaranea betsileo* Griswold, ♀ from Talatakely, abdominal petiole, lateral (arrow to horn on petiole). D. *Buibui cyrtata*, new species, ♀, Kanzuiri, anterior view of cephalothorax. E. *Alaranea betsileo* Griswold, ♂ from Talatakely, lateral view of cephalothorax. F. *Isicabu kombo*, new species, Mbomole, Amani, ♀, ventral view of cephalothorax. G. *Wanzia fako* Griswold, ♀ from Mount Oku, ventral view of cephalothorax. H. *Alaranea betsileo* Griswold, ♂ from Talatakely, ventral view of cephalothorax. Scale bars for A = 200 µm; B = 150 µm; C = 200 µm; D = 200 µm; F = 250 µm; E, G, H = 300 µm.

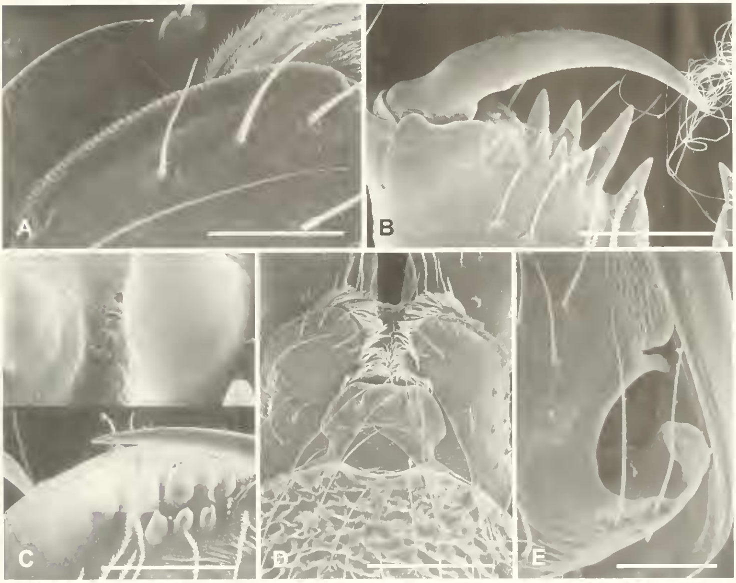


FIGURE 5. Morphology of Cyatholipidae. A–D. *Wanzia fako* Griswold, ♀ from Mount Oku. A. Serrula of pedipalpal coxa. B. Chelicera, posterior view. C. Chelicera, apical view (lower), with close-up of possible cheliceral gland opening (upper). D. Apex of sternum, labium, and pedipalpal coxae, ventral. E. *Pokennips dentipes* (Simon), ♂ from Buffels Bay, cymbial RMP and PC, retrolateral view. Scale bars for A = 50 μm; B, C = 100 μm; D = 200 μm; E = 75 μm.

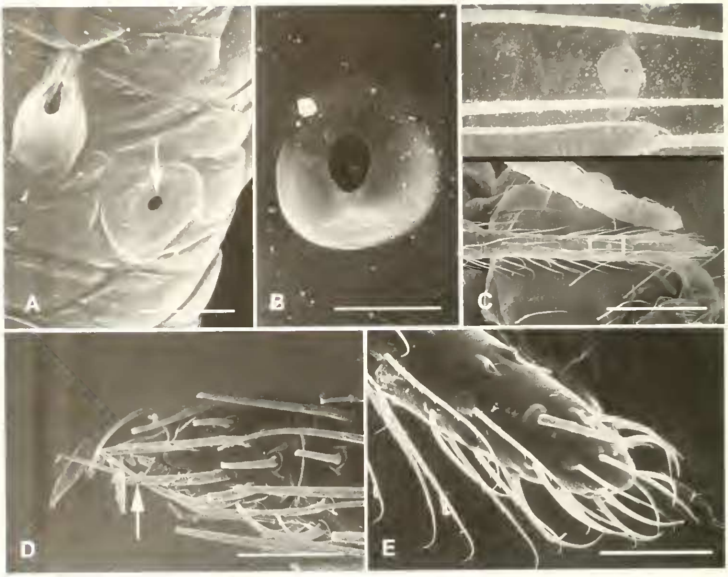


FIGURE 6. Limb morphology of Cyatholipidae. A, B, D, E. *Pembatatu mafuta*, new species, specimens from Mt. Elgon. C. *Toddiana daviesae* Forster, juvenile from Bulburin S. F. A. Tarsal organ (arrow) and setae base, ♀ leg I. B. Trichobothrial base, ♀ tibia I. C. Apex of leg III with close-up of tarsal organ; inset on lower figure shows median position of tarsal organ. D. Tarsal claws and "araneoid" serrate setae (arrow), ♂ leg I. E. Apex of ♀ pedipalp. Scale bars for A, B = 10 µm; C = 150 µm; D = 20 µm; E = 50 µm.

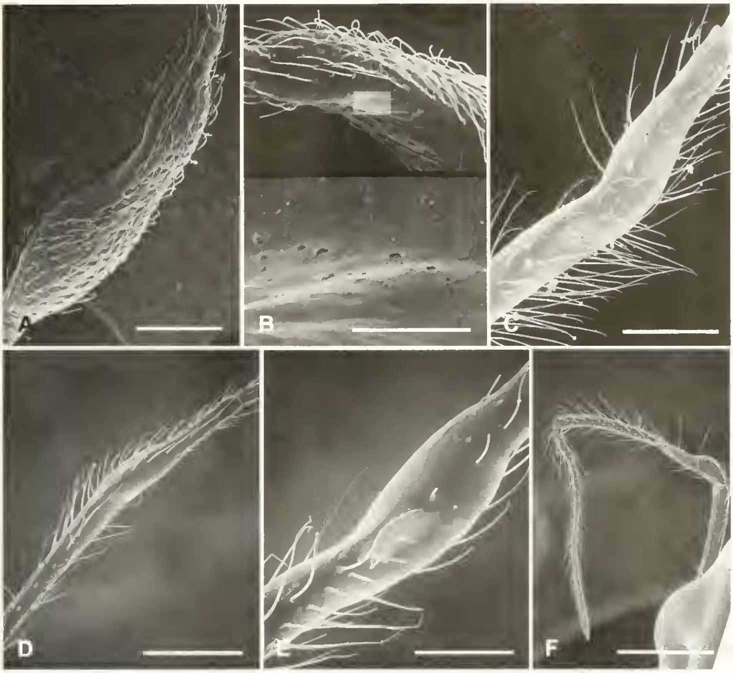


FIGURE 7. Legs of Cyatholipidae. A. *Pembatatu mafuta*, new species, paratype, ♂ metatarsus I. B. *Pembatatu mafuta*, new species, paratype, ♂ metatarsus I, close-up showing pores on swelling. C. *Buibui cyrtata*, new species, holotype ♂, metatarsus I. D, E. *Buibui abyssinica*, new species, ♂ from Debre Birhan Rd., metatarsus I. F. *Isicabu kombo*, new species, ♂ from Amani, leg I. Scale bars for A, B = 200 μm; C = 200 μm; D = 250 μm; E = 100 μm; F = 50 μm.

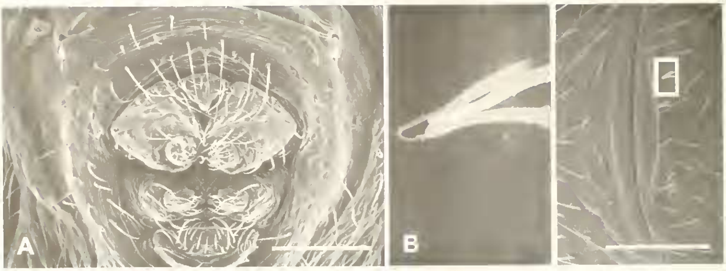


FIGURE 8. Abdominal morphology of Cyatholipidae. A. *Scharffia chinja* Griswold, ♀ from Mwanihana, spinnerets and posterior spiracle (arrows to ends of spiracle). B. *Alaranea merina* Griswold, ♂ from Perinét, epiandrous region: epigastric furrow with epiandrous spigots (right), close-up of epiandrous spigots (left). Scale bars for A, B = 100 µm.

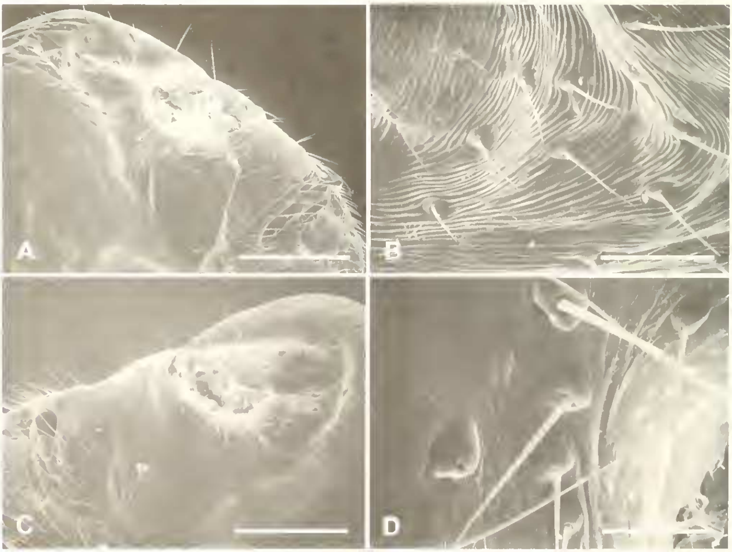


FIGURE 9. Abdomens of Cyatholipidae. A, B. *Tekelloides australis* Forster, ♀ from Peel Forest, Canterbury. C, D. *Toddiana daviesae* Forster, ♀ from Bulburin S. F. A, C. Anterior surface surrounding pedicel. B. Setae above pedicel. D. Setae above pedicel, showing enlarged bases. Scale bars for A = 250 µm, B = 60 µm, C = 200 µm, D = 30 µm.

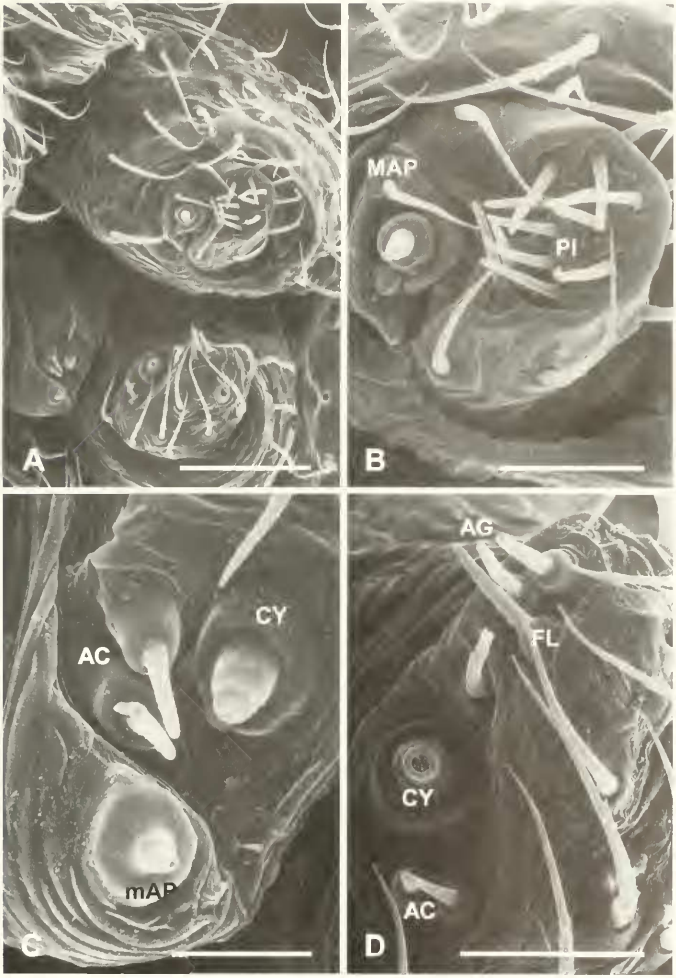
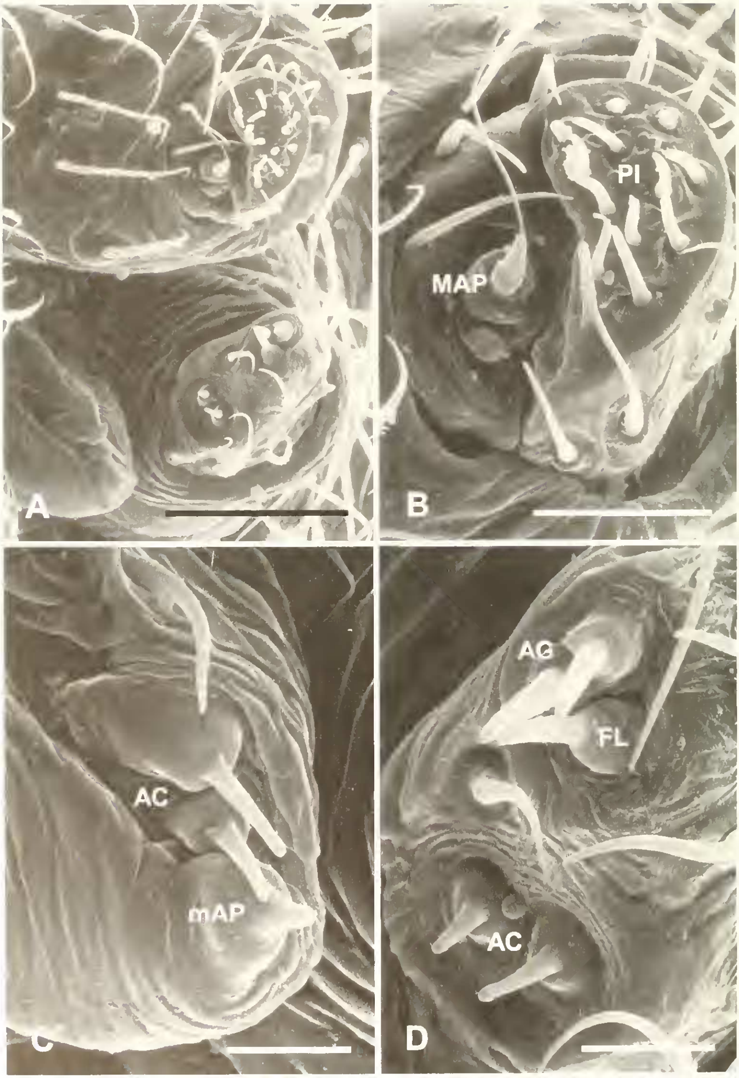


FIGURE 10. Left spinnerets of ♀ *Uvik vulgaris*, new species, from Volcan Nyiragongo. A. Overview. B. ALS. C. PMS. D. PLS. AC = aciniform gland spigots, AG = aggregate gland spigots, CY = cylindrical gland spigots, FL = flagelliform gland spigot, MAP = major ampullate gland spigot, mAP = minor ampullate gland spigot, Pl = piriform gland spigots. Scale bars for A = 50 µm, B, C = 20 µm, D = 10 µm.


A
B
MAP
PI
C
AC
mAP
D
AC
FL
AC

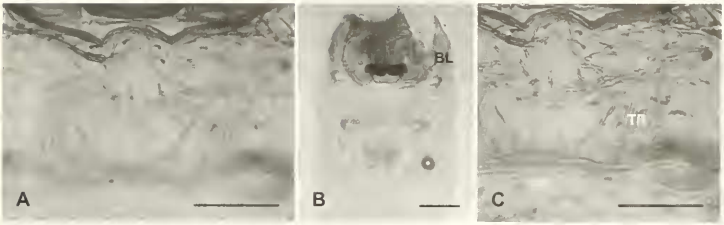


FIGURE 12. Respiratory system of ♀ *Ulwembua outeniqua* from Diepwalle, dorsal view of cleared abdomen. A, C. Close up of posterior spiracle and tracheae. B. Whole abdomen. BL = book lungs, SP = spiracle, TR = tracheae. Scale bars for A–C = 0.1 mm.

←

FIGURE 11. Left spinnerets of ♂ *Uvik vulgaris*, new species, from Volcan Nyiragongo. A. Overview. B. ALS. C. PMS. D. PLS. AC = aciniform gland spigots, AG = aggregate gland spigots, FL = flagelliform gland spigot, MAP = major ampullate gland spigot, mAP = minor ampullate gland spigot, PI = piriform gland spigots. Scale bars for A = 50 µm; B = 20 µm; C, D = 10 µm.

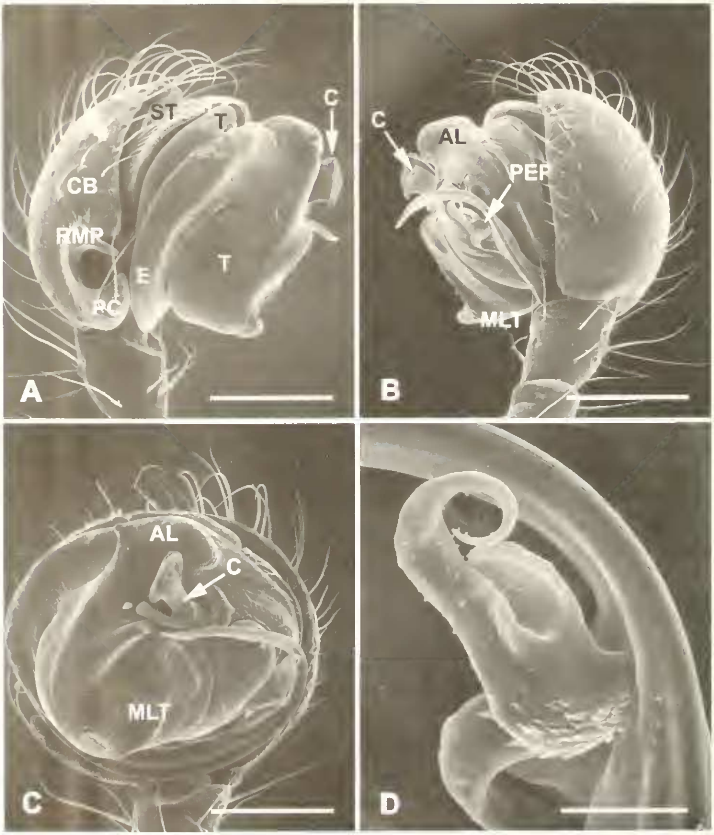


FIGURE 13. *Buibui abyssinica*, new species, right pedipalpus of ♂ from Debre Birhan Rd. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. AL = apical lobe of tegulum, C = conductor, CB = cymbium, E = embolus, MLT = median lobe of tegulum, PC = paracymbium, PEP = parembolic process, RMP = retromedian cymbial process, ST = subtegulum, T = tegulum. Scale bars for A = 130 μm, B = 150 μm, C = 120 μm, D = 25 μm.

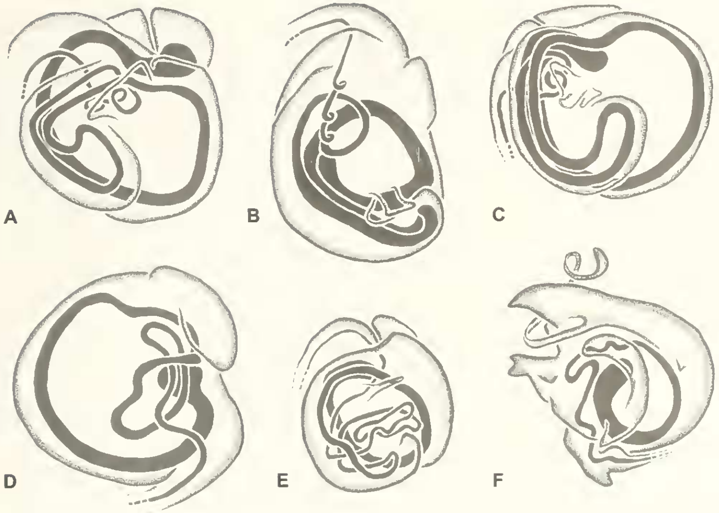


FIGURE 14. Reservoir course in palpal bulbs of Cyatholipidae, ventral view, all right palps except *Matilda* left. A. *Kubwa singularis*, new species. B. *Tekelloides australis* Forster. C. *Uvik vulgaris*, new species. D. *Matilda australia* Forster. E. *Tekella absidata* Urquhart. F. *Toddiana daviesae* Forster. Illustrations by CG.

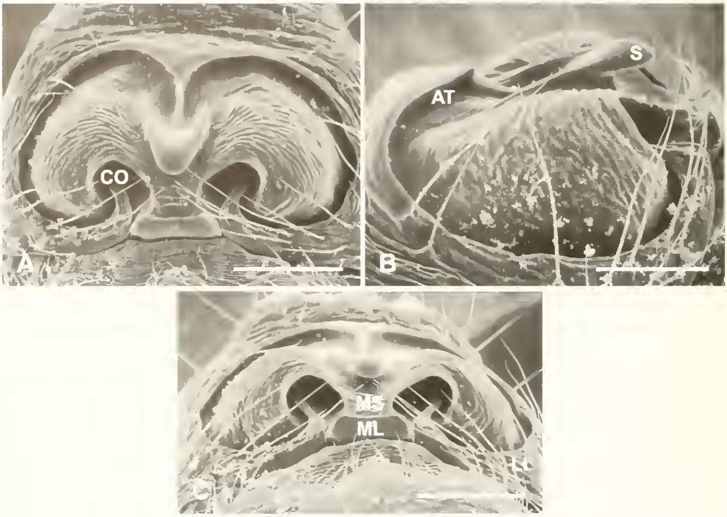


FIGURE 15. Epigynum of *Ulwembua denticulata* Griswold from Misty Mountain. A. Ventral. B. Lateral. C. Posterior. AT = epigynal atrium, CO = copulatory opening, LL = lateral lobes of epigynum, ML = epigynal median lobe, MS = epigynal median septum, S = epigynal scape. Scale bars for A, C = 120 µm; B = 75 µm.

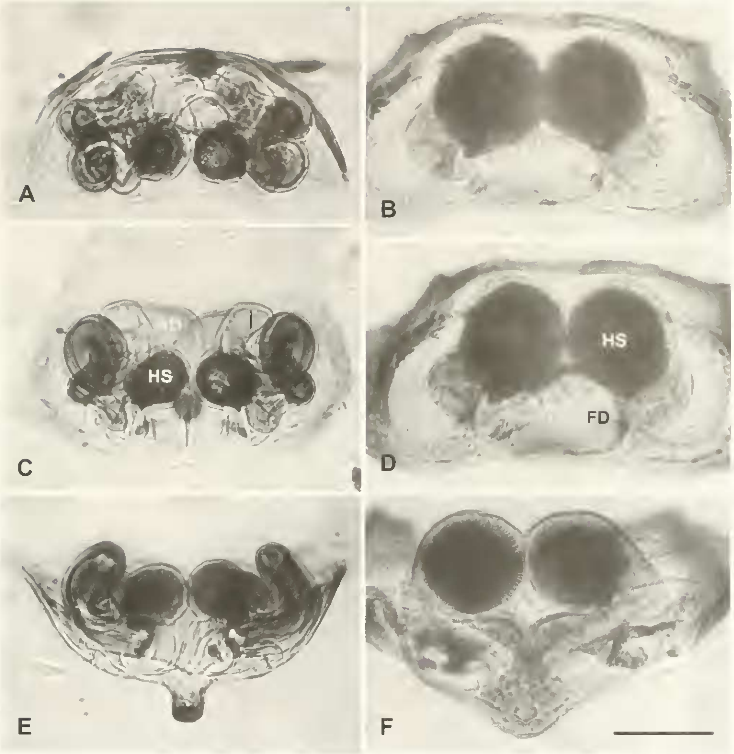


FIGURE 16. Cleared vulvae of Cyatholipidae. A, C, E. *Ulwembua ranomafana* Griswold, paratype. B, D, F. *Wanzia fako* Griswold, from mist forest on Mount Cameroon. A, B. Anterior. C, D. Dorsal. E, F. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

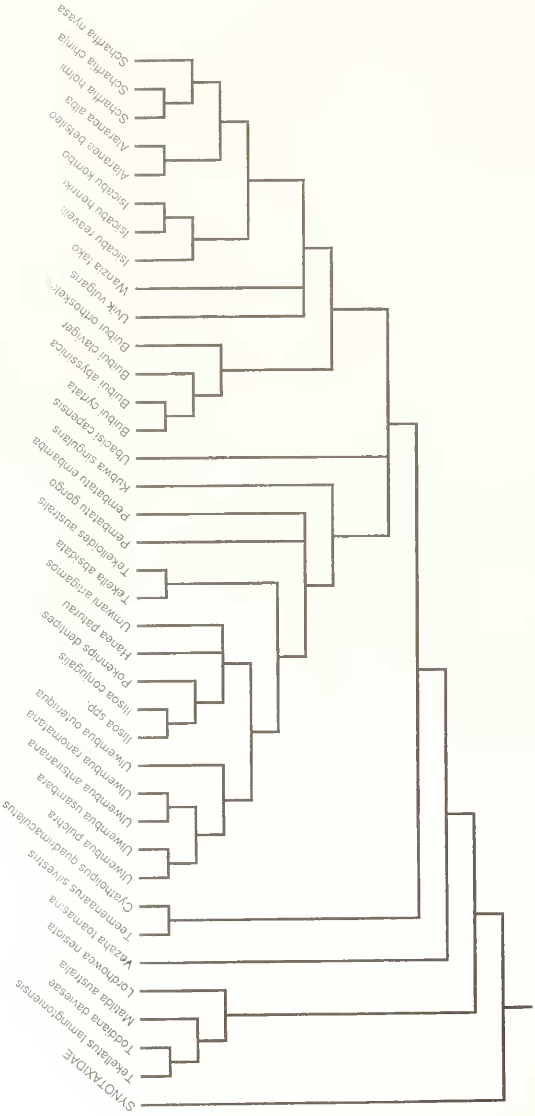


FIGURE 17. The nelsen (strict) consensus of 54 cladograms of 159 steps.

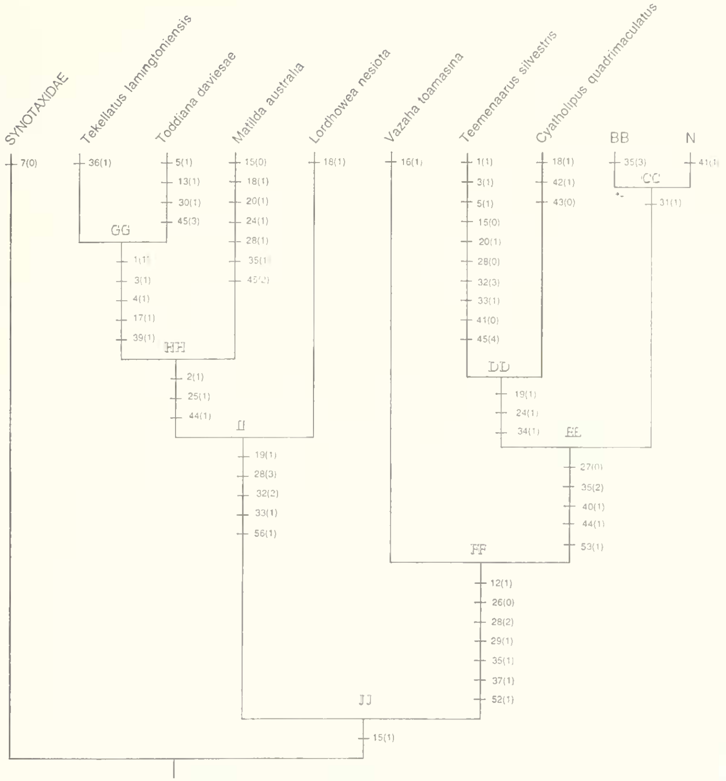


FIGURE 18. Preferred 159 step cladogram for Cyatholipidae, basal nodes (see text for explanation); c.i. = 0.47, r.i. = 0.72. Characters with their apomorphic state changes (in parens) are marked on branches. Bremer support (decay indices) for nodes: JJ (not calculated), II (>2), HH (2), GG (>2), FF (>2), EE (>2), DD (2), CC (1), BB (1), N (0).

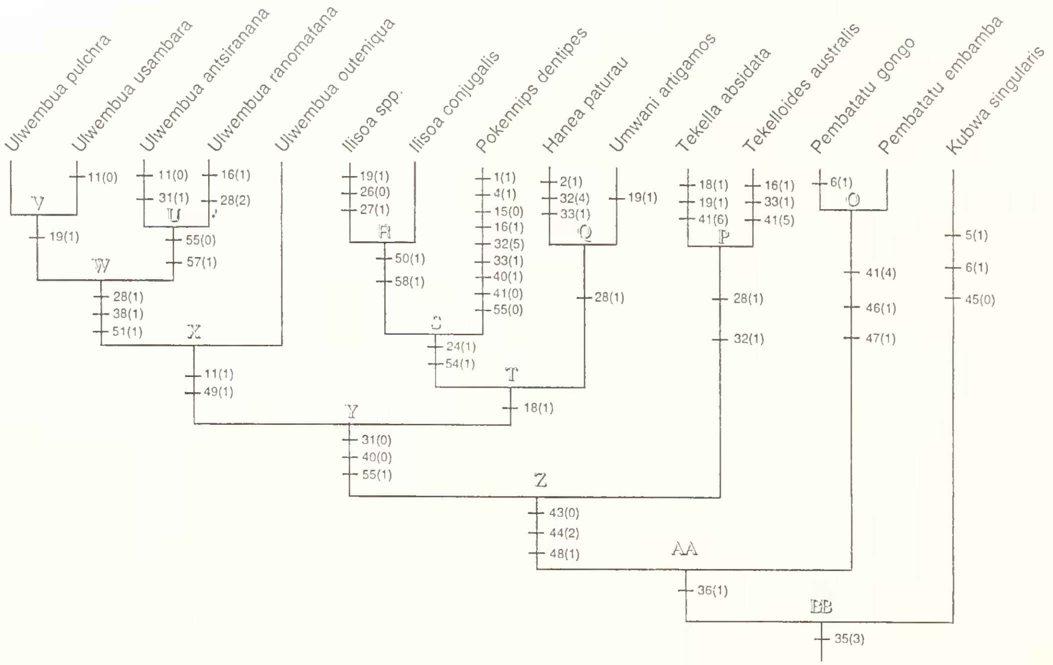


FIGURE 19. Preferred 159 step cladogram for Cyatholipidae, clade BB (see text for explanation); c.i. = 0.47, r.i. = 0.72. Characters with their apomorphic state changes (in parens) are marked on branches. Bremer support (decay indices) for nodes: BB (1), AA (1), Z (1), Y (1), X (1), W (1), V (1), U (1), T (1), S (1), R (2), Q (0), P (1), O (0).

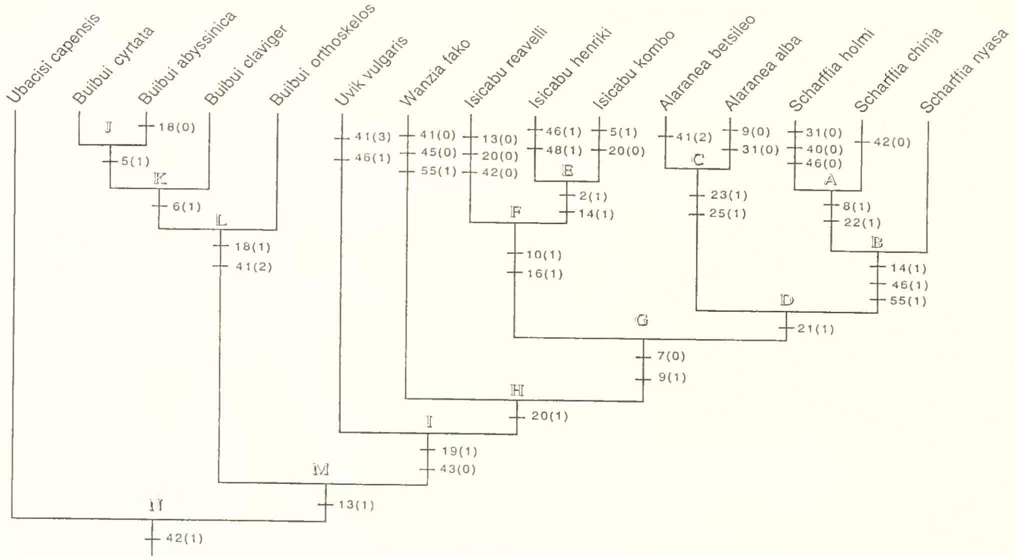


FIGURE 20. Preferred 159 step cladogram for Cyatholipidae, clade N (see text for explanation); c.i. = 0.47, r.i. = 0.72. Characters with their apomorphic state changes (in parens) are marked on branches. Bremer support (decay indices) for nodes: N (0), M (1), L (1), K (1), J (1), I (1), H (0), G (1), F (2), E (1), D (1), C (2), B (2), A (1).

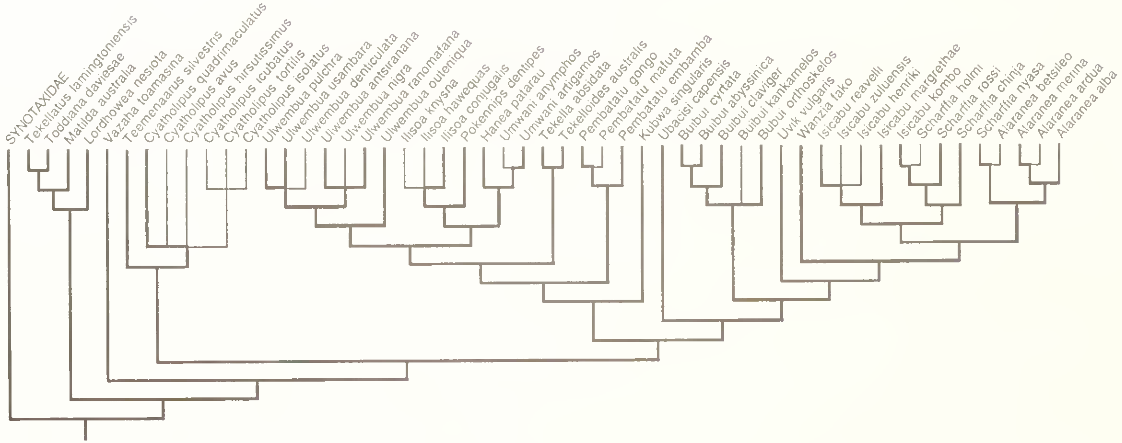


FIGURE 21. Cladogram for all Afrotropical Cyatholipidae. Structure derived from preferred 159 step cladogram of exemplars shown in bold; non exemplar species added as thin lines.

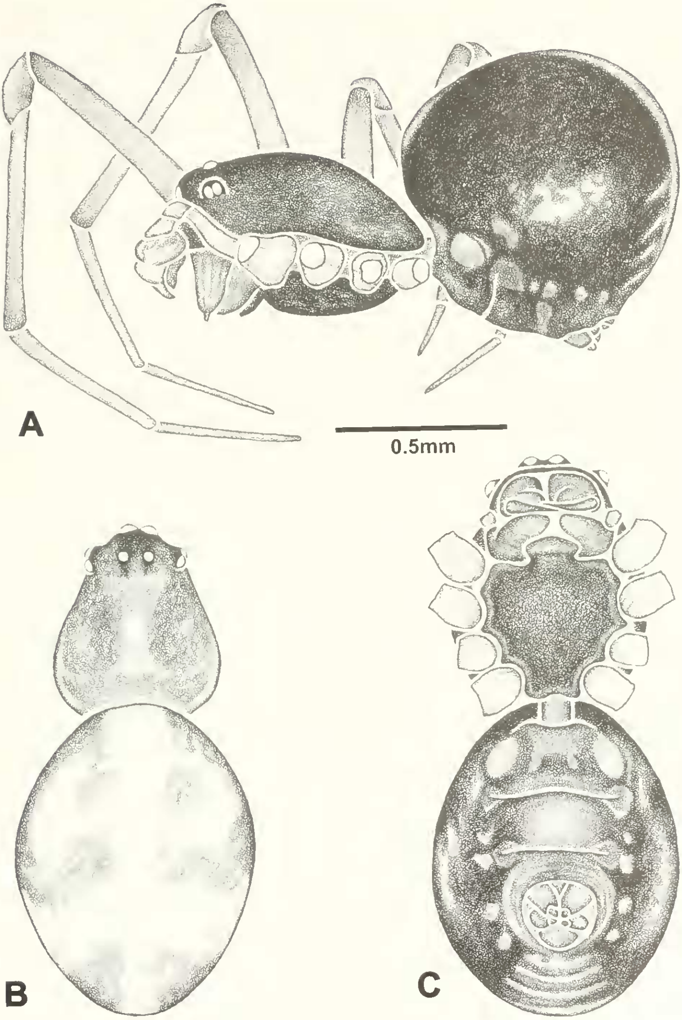


FIGURE 22. *Lordhowea nesiota*, new species. A. Holotype ♂, lateral. B. Paratype ♀, dorsal. C. Holotype ♂, ventral. Illustrations by JS.

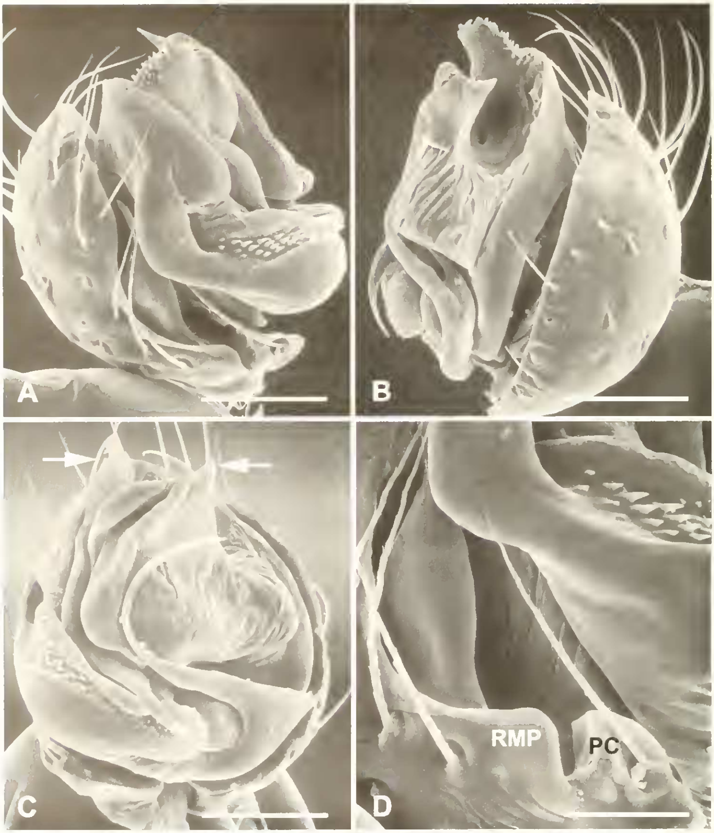


FIGURE 23. *Lordhowea nesiota*, new species, right pedipalpus of holotype ♂. A. Retrolateral. B. Prolateral. C. Ventral (arrows to dorsal and ventral pointed lobes on tegulum). D. Detail of paracymbium and retromedian cymbial process. PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A–C = 60 μm, D = 30 μm.

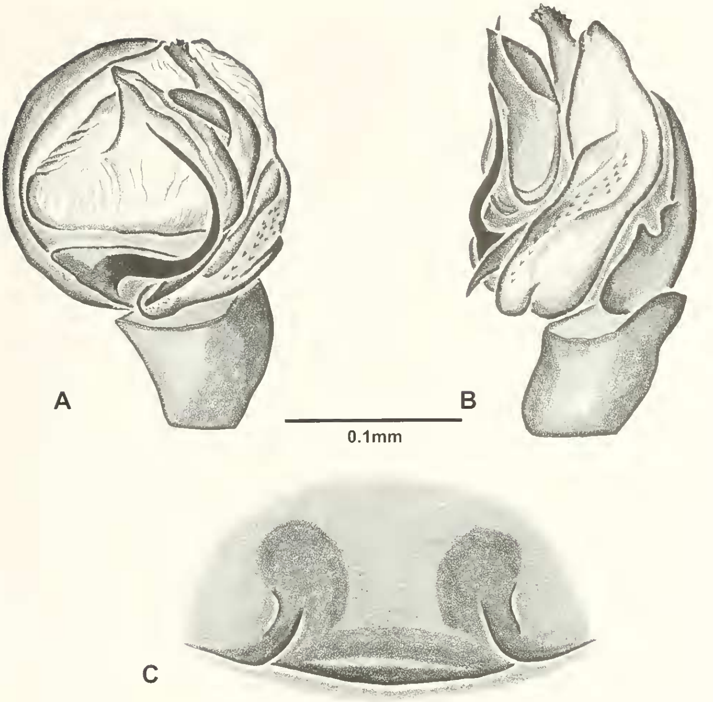


FIGURE 24. Genitalia of *Lordhowea nesiota*, new species. A, B. Left ♂ palpus of holotype; C. Epigynum of paratype; A, C. Ventral. B. Retrolateral. Illustrations by CG.

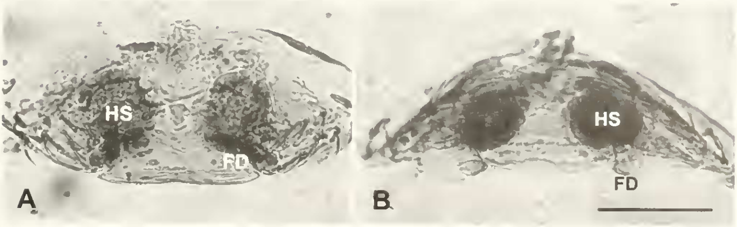


FIGURE 25. Cleared vulva of *Lordhowea nesiota*, new species, paratype. A. Dorsal. B. Anterior. HS = spermathecal heads, FD = fertilization ducts. Scale bar = 0.1 mm.

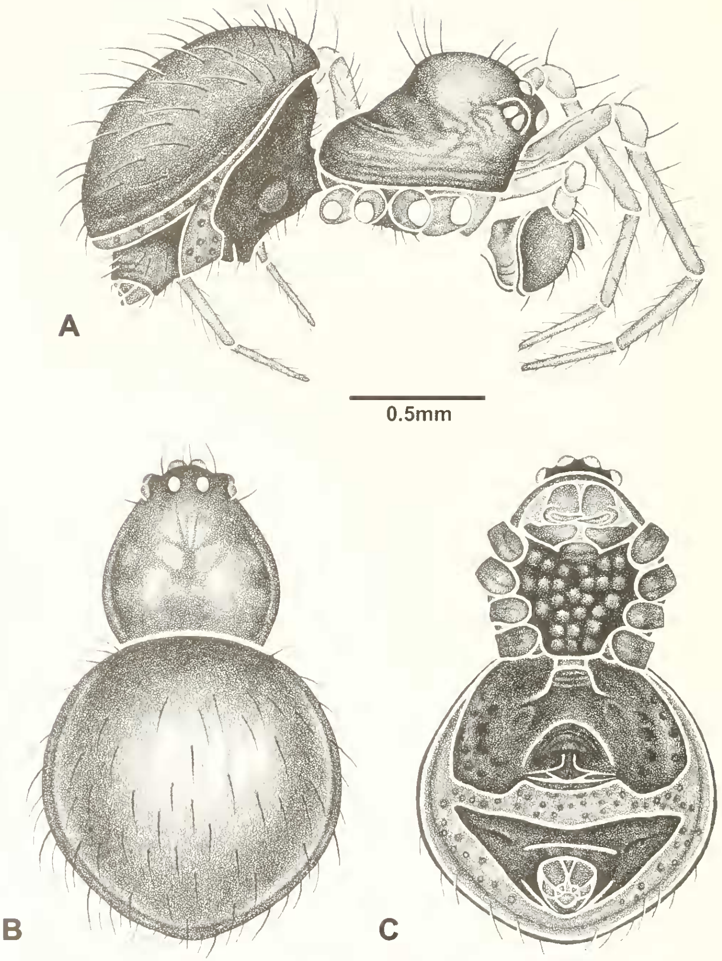


FIGURE 26. *Matilda australia* Forster, Mount Lewis, Queensland. A. ♂, lateral. B. ♀, dorsal. C. ♀, ventral. Illustrations by JS.

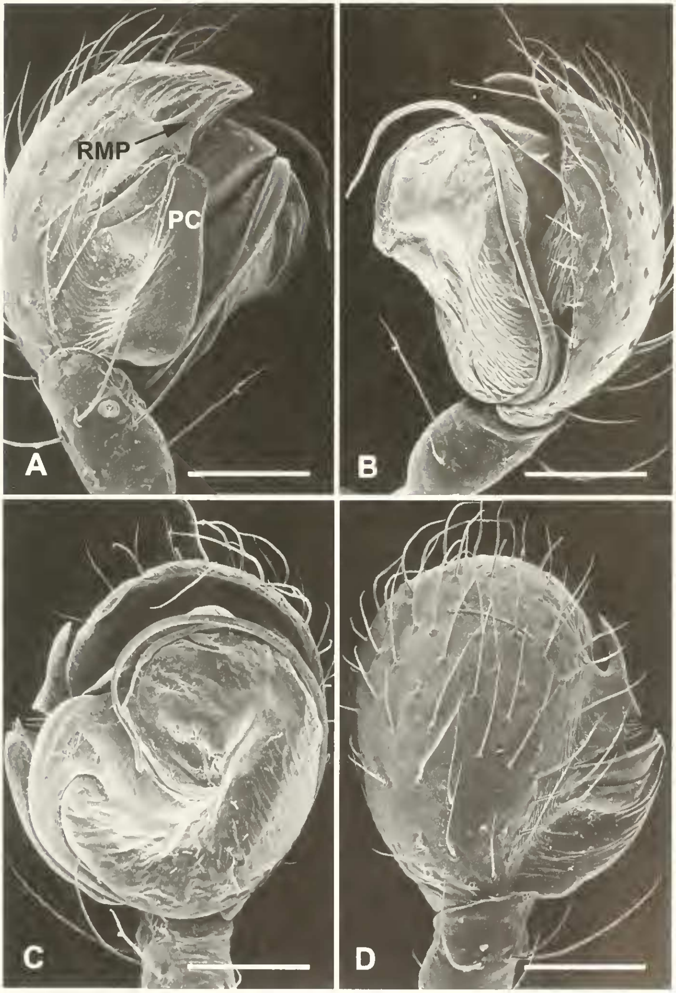


FIGURE 27. *Matilda australia* Forster, right pedipalpus of ♂ from Mount Lewis, Queensland. A. Retrolateral. B. Prolateral. C. Ventral. D. Dorsal. PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A–D = 100 μm.

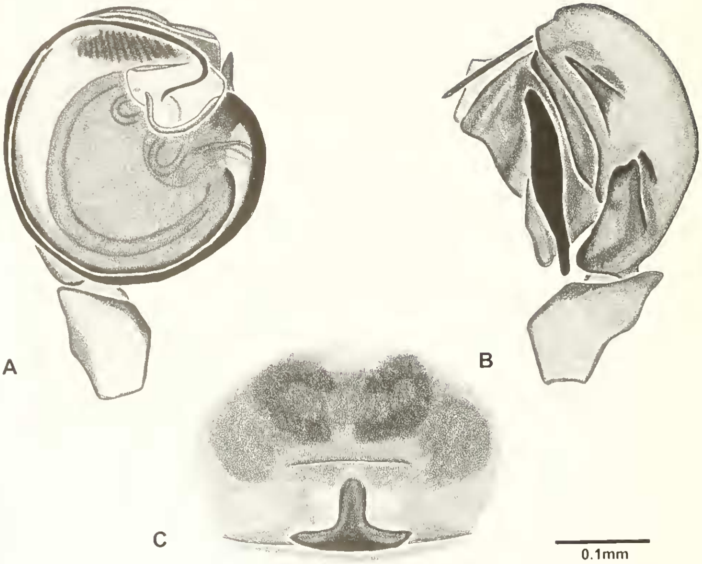


FIGURE 28. Genitalia of *Matilda australia* Forster from Mount Lewis, Queensland. A, B. Left ♂ palpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by CG.

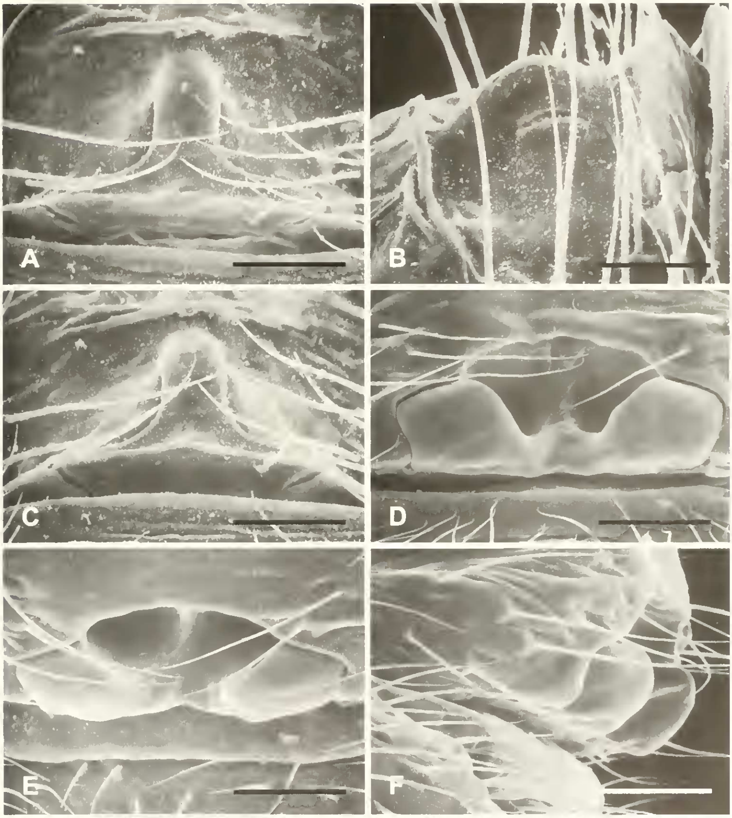


FIGURE 29. Epigyna of Cyatholipidae. A–C. *Matilda australia* Forster, from Majors Mt., Queensland. D–F. *Toddiana daviesae* Forster, from Bulburin S. F., Queensland. A, D. Ventral. B, F. Lateral. C, E. Posterior. Scale bars for A, C, F = 43 μm; B = 30 μm; D, E = 50 μm.

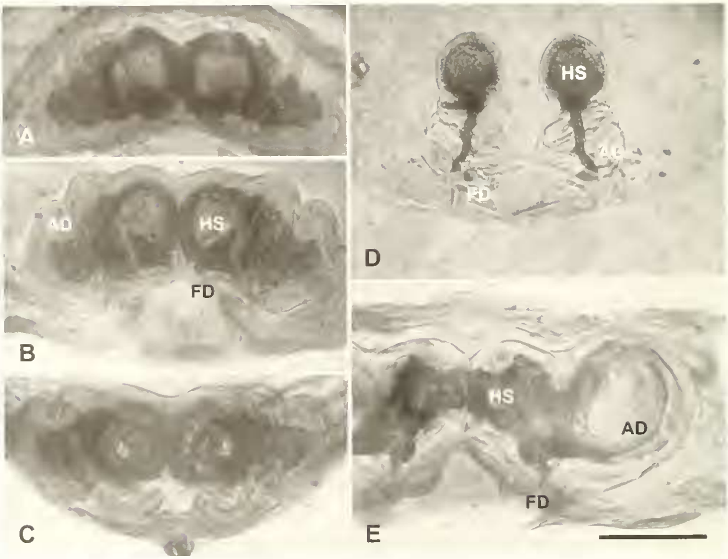


FIGURE 30. Cleared vulvae of Cyatholipidae. A–C. *Matilda australia* Forster, from Major's Mt., Queensland. D. *Toddiana daviesae* Forster, from Bulburin S. F., Queensland. E. *Teemenaarus silvestris* Davies, paratype. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. A. Anterior. B, D, E. Dorsal. C. Posterior. Scale bar = 0.1 mm.

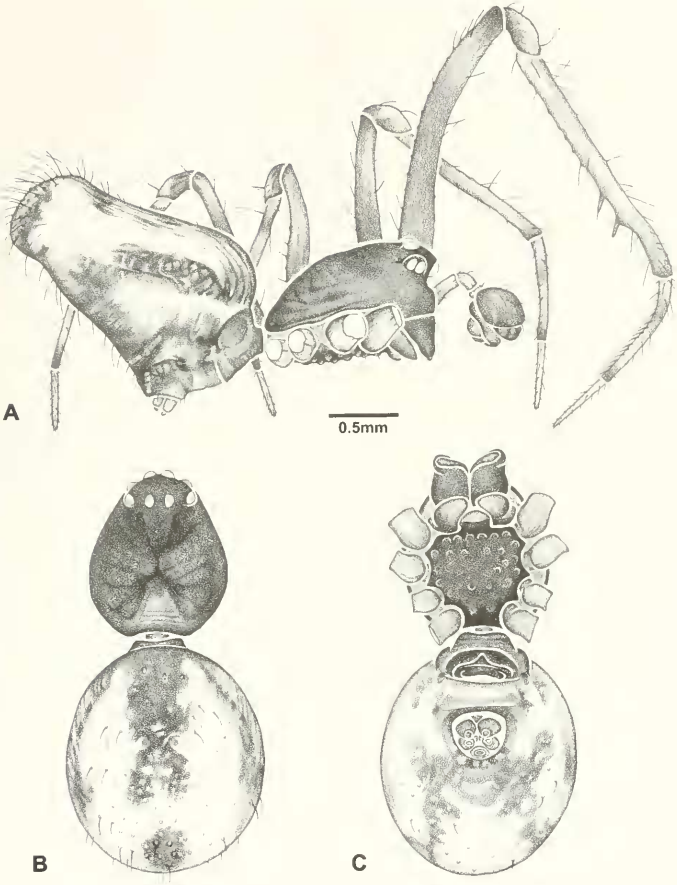


FIGURE 31. *Teemenaarus silvestris* Davies, paratypes. A. ♂, lateral. B. ♀, dorsal. C. ♀, ventral. Illustrations by JS.

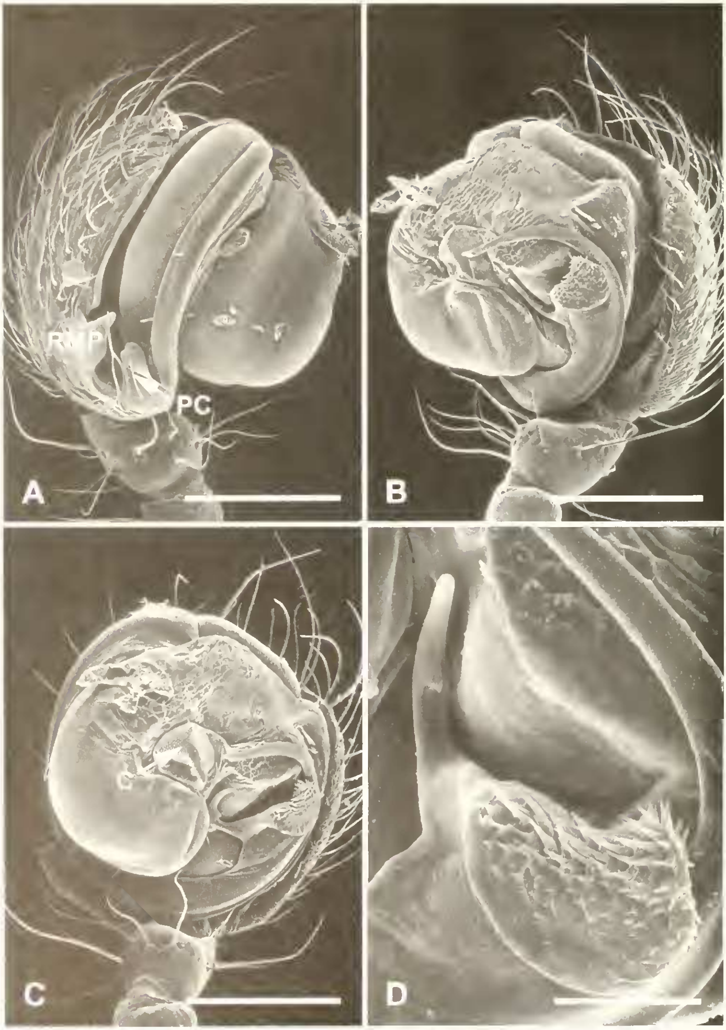


FIGURE 32. *Teemenaarus silvestris* Davies, paratype ♂, right palpus. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. C = conductor, PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A–C = 200 µm, D = 50 µm.

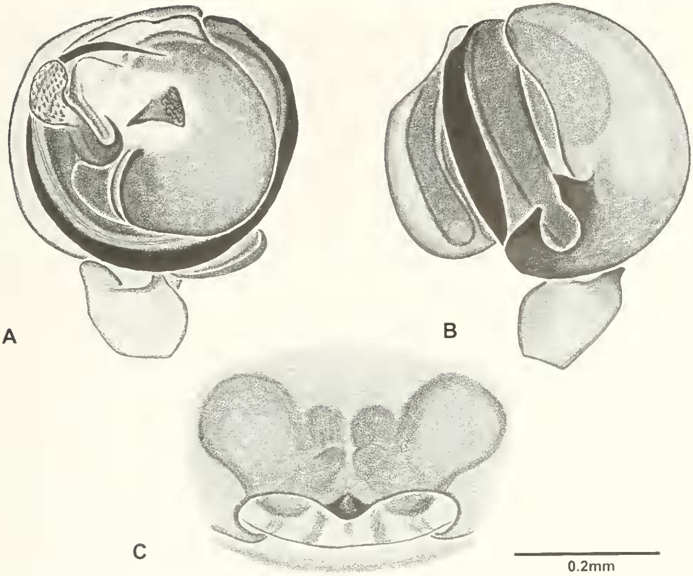


FIGURE 33. Genitalia of *Teemenaarus silvestris* Davies, paratypes. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by CG.

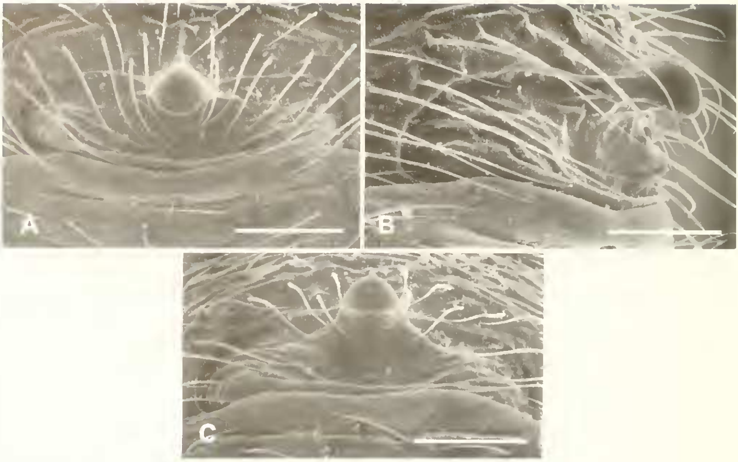


FIGURE 34. Epigynum of *Teemenaarus silvestris* Davies, from Kuranda. A. Ventral. B. Lateral. C. Posterior. Scale bars for A, C = 86 μm; B = 60 μm.

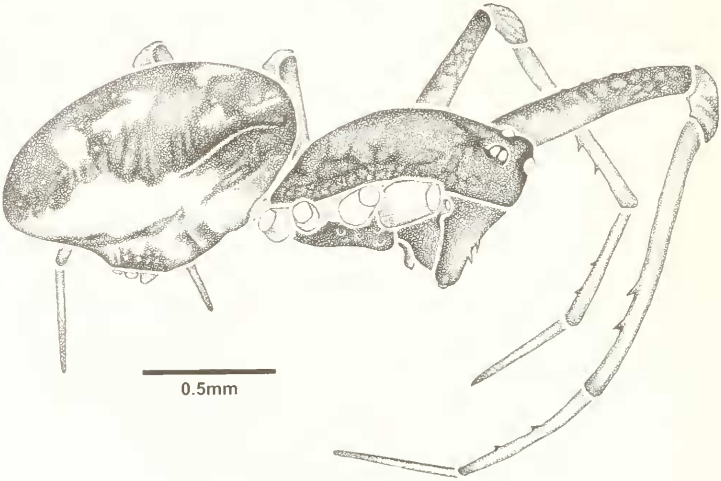


FIGURE 35. *Tekellatus lamingtoniensis* Wunderlich, holotype ♂, lateral. Illustration by JS.

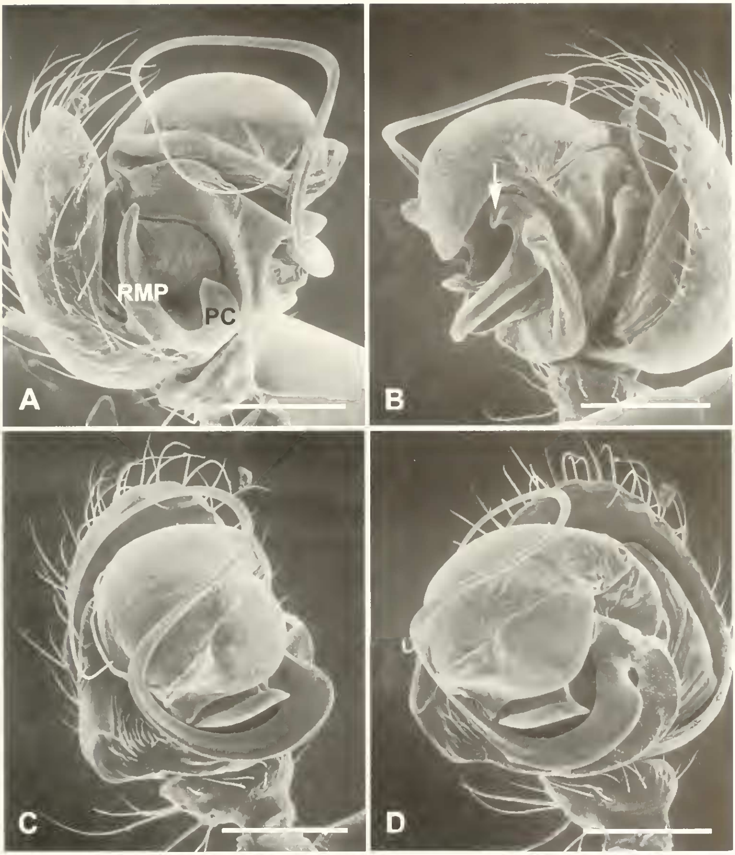


FIGURE 36. *Tekellatus lamingtoniensis* Wunderlich, ♂ from O'Reillys, Queensland, right pedipalpus. PC = paracymbium, RMP = retromedian cymbial process, arrow points to recurved lobe near the embolic base. A. Retrolateral. B. Prolateral. C. Retroventral. D. Ventral. Scale bars for A–D = 120 μm.

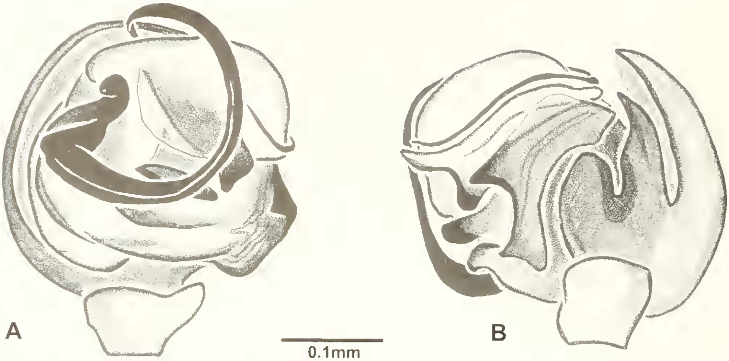


FIGURE 37. *Tekellatus lamingtoniensis* Wunderlich, ♂ from O'Reillys, Queensland, left pedipalpus. A. Ventral. B. Retrolateral. Illustrations by CG.

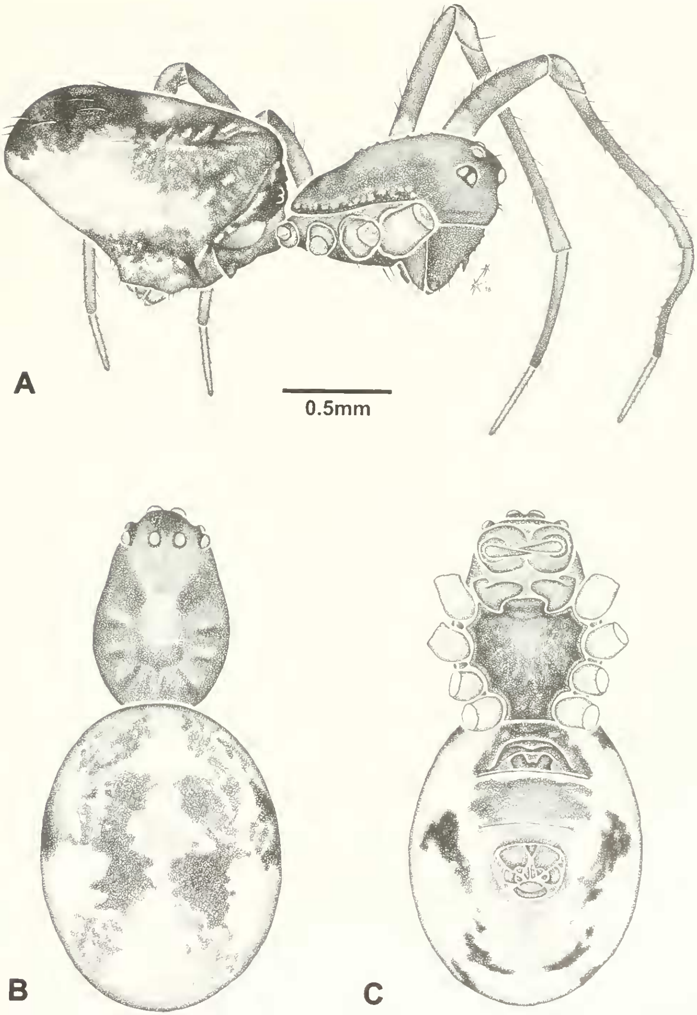


FIGURE 38. *Toddiana daviesae* Forster, from Bulburin S. F., Queensland. A. ♂, lateral. B. ♀, dorsal. C. ♀, ventral. Illustrations by JS.

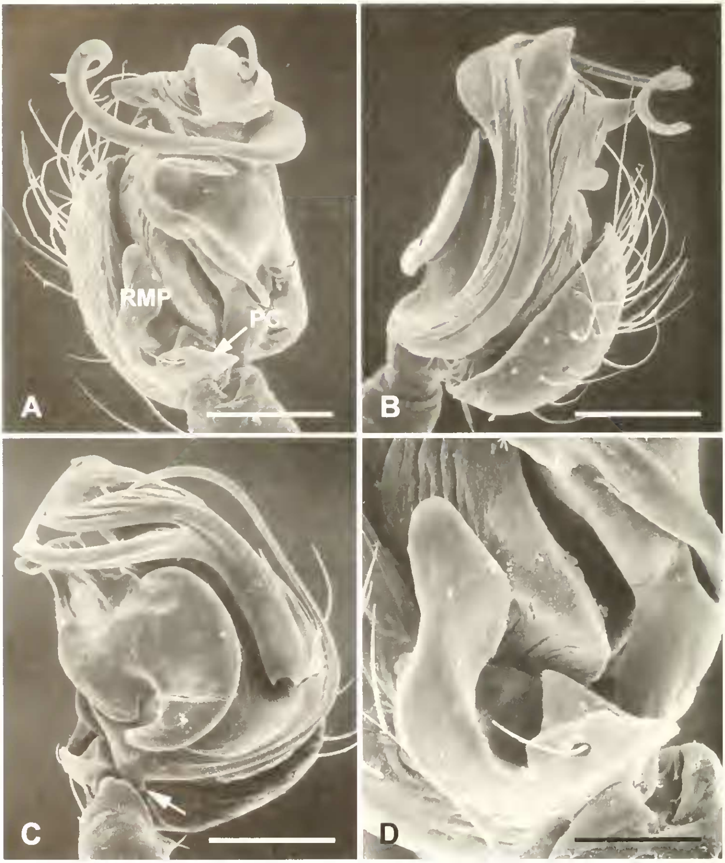


FIGURE 39. *Toddiana daviesae* Forster, right pedipalpus of ♂ from Bulburin S. F., Queensland. A. Retrolateral. B. Prolateral. C. Ventral. D. Detail of paracymbium and retromedian cymbial process. PC = paracymbium, RMP = retromedian cymbial process, unlabeled arrow on C points to recurved lobe near the embolic base. Scale bars for A–C = 100 μm, D = 43 μm.

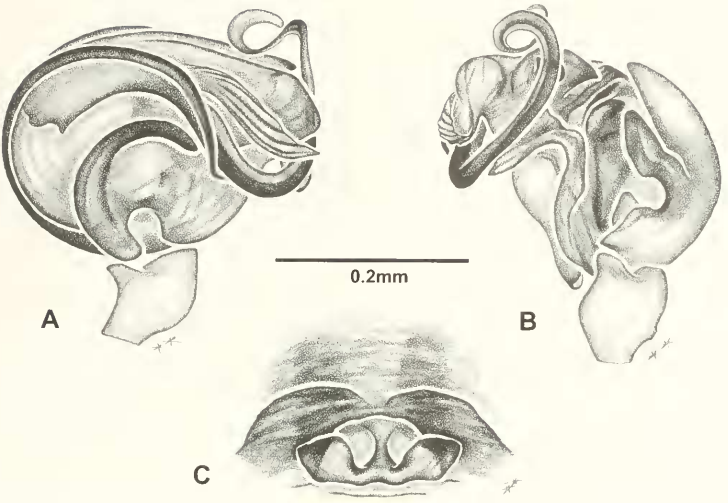


FIGURE 40. *Toddiana daviesae* Forster, genitalia of specimens from Bulburin S. F., Queensland. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

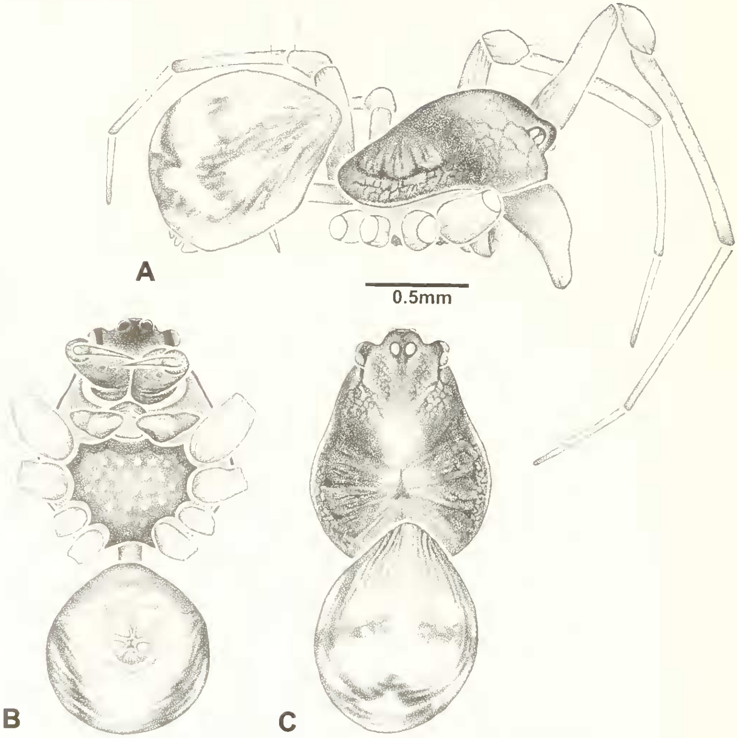


FIGURE 41. *Hanea paturau* Forster, holotype ♂ (pedicel is artificially stretched). A. Lateral. B. Ventral. C. Dorsal. Illustrations by JS.

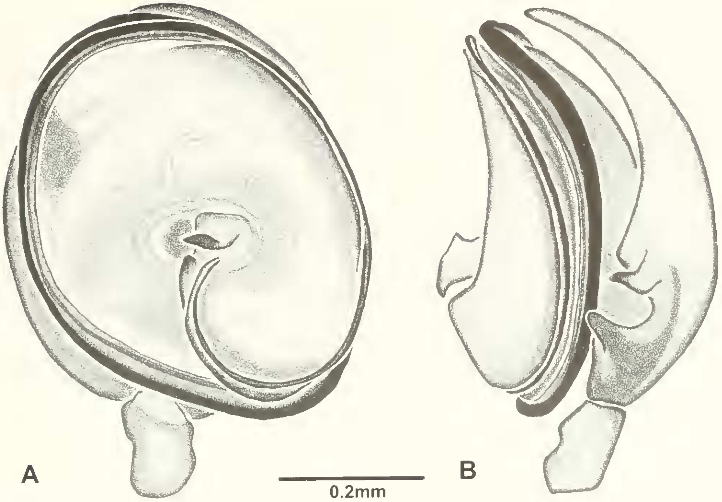


FIGURE 42. *Hanea paturau* Forster, holotype ♂, left pedipalpus. A. Ventral. B. Retrolateral. Illustrations by CG.

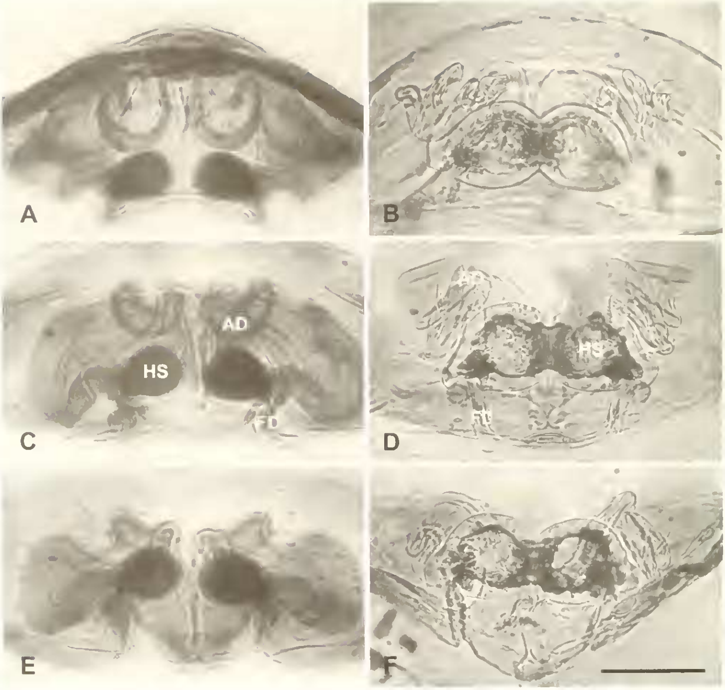


FIGURE 43. Cleared vulvae of New Zealand Cyatholipidae. A, C, E. *Tekella absidata* Urquhart from Peel Forest, Canterbury. B, D, E. *Tekelloides australis* Forster from Peel Forest, Canterbury. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. A, B. Anterior. C, D. Dorsal. E, F. Posterior. Scale bar = 0.1 mm.

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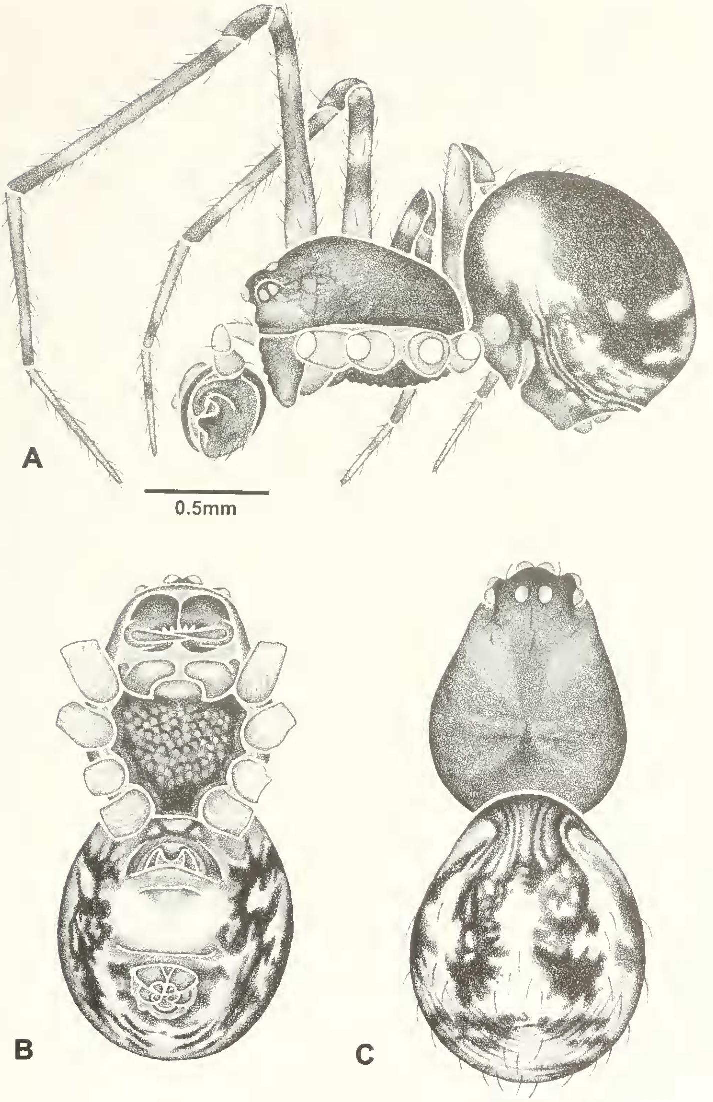
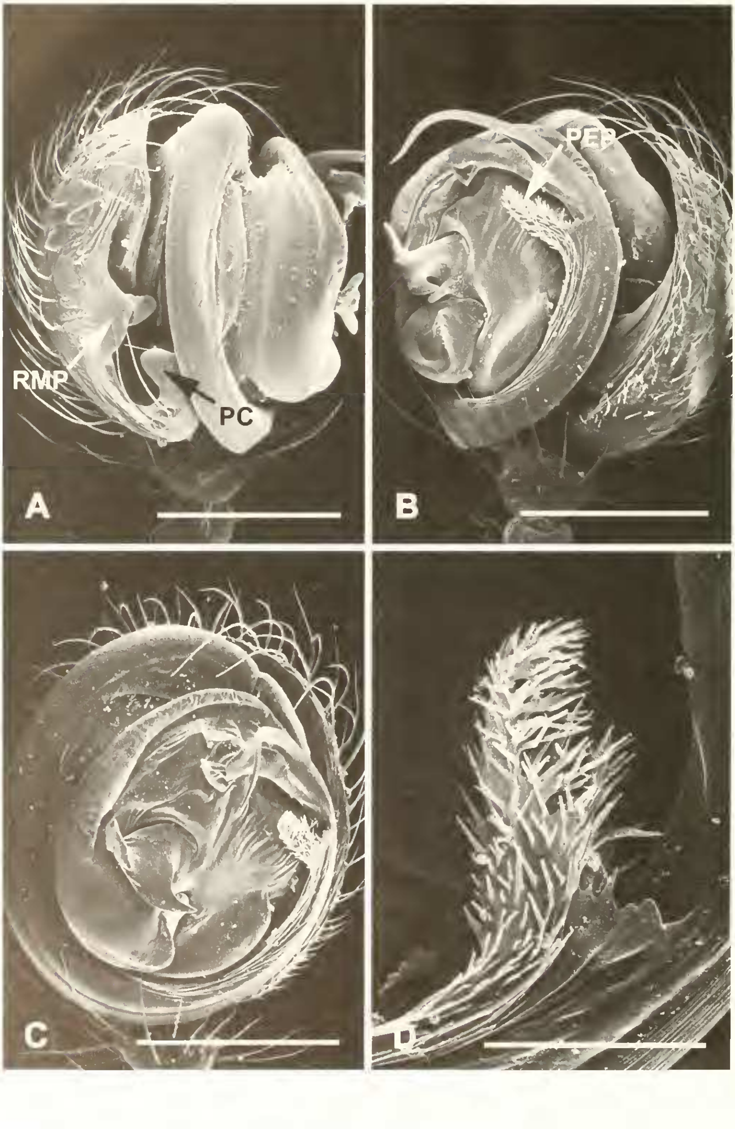
FIGURE 44. *Tekella absidata* Urquhart, from Peel Forest, Canterbury. A. ♂, lateral. B. ♀, ventral. C. ♀, dorsal. Illustrations by JS.


A
0.5mm
B
C


RMP
PC
A
PEP
B
C
D

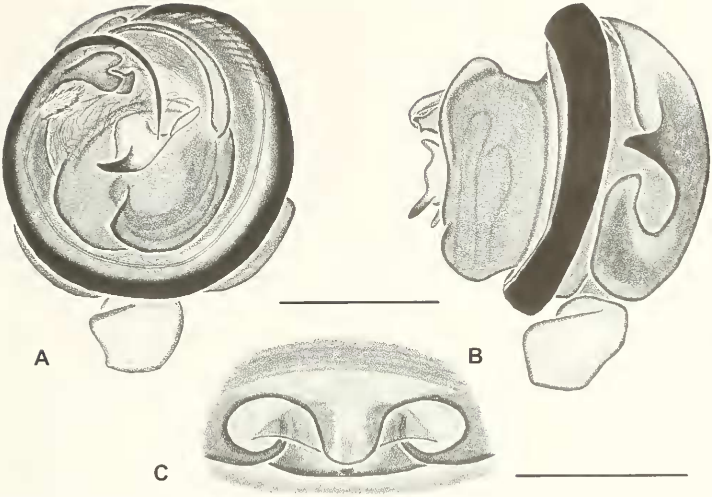


FIGURE 46. Genitalia of *Tekella absidata* Urquhart, from Peel Forest, Canterbury. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by CG.

←

FIGURE 45. *Tekella absidata* Urquhart, right pedipalpus of ♂ from Peel Forest, Canterbury. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. PC = paracymbium, PEP = parembolic process, RMP = retromedian cymbial process. Scale bars for A–C = 200 μm, D = 50 μm.

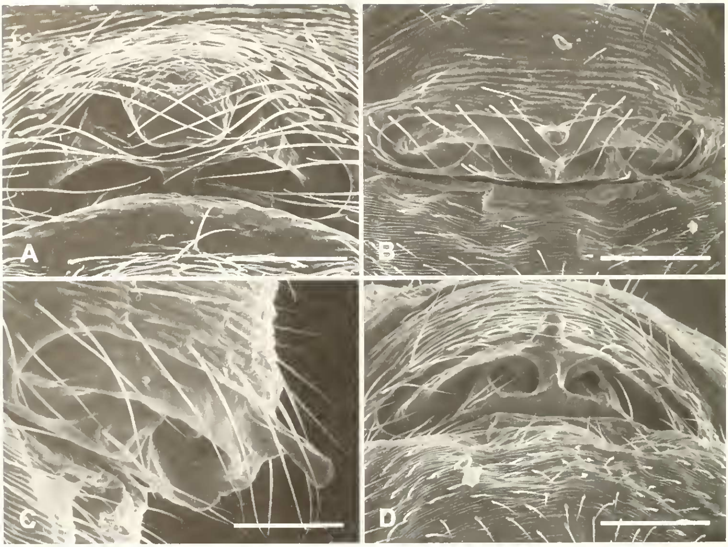


FIGURE 47. Epigyna of New Zealand Cyatholipidae. A. *Tekella absidata* Urquhart, from Peel Forest, Canterbury. B–D. *Tekelloides australis* Forster, from Peel Forest, Canterbury. A, B. Ventral. C. Lateral. D. Posterior. Scale bars for A = 100 μm; B, D = 120 μm; C = 60 μm.

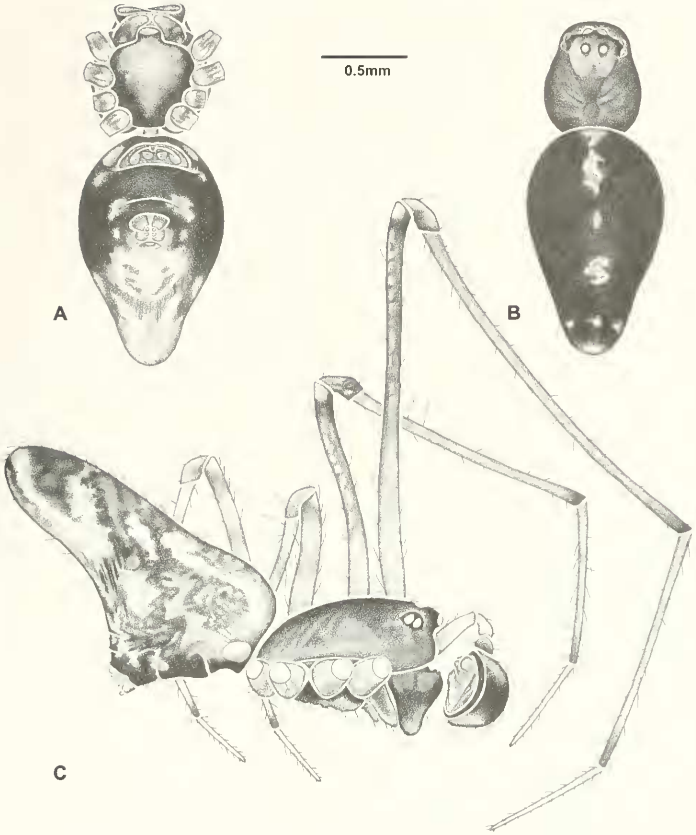
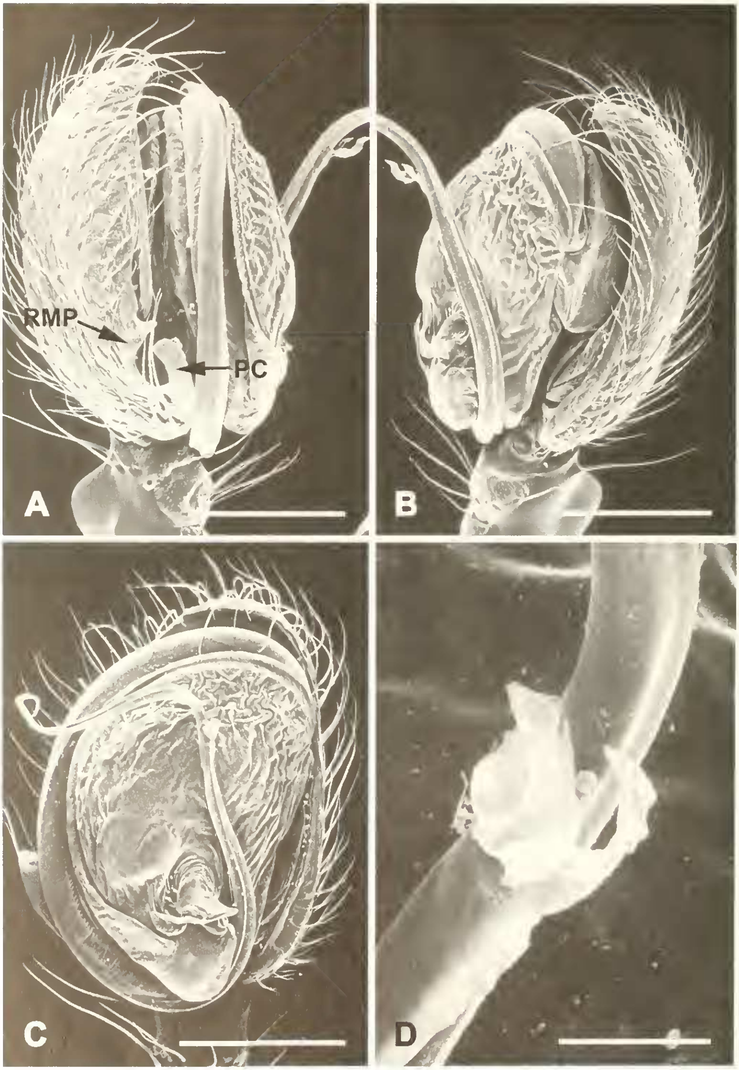


FIGURE 48. *Tekelloides australis* Forster, from Peel Forest, Canterbury. A. ♀, ventral. B. ♀, dorsal. C. ♂, lateral. Illustrations by JS.


RMP
PC
A
B
C
D

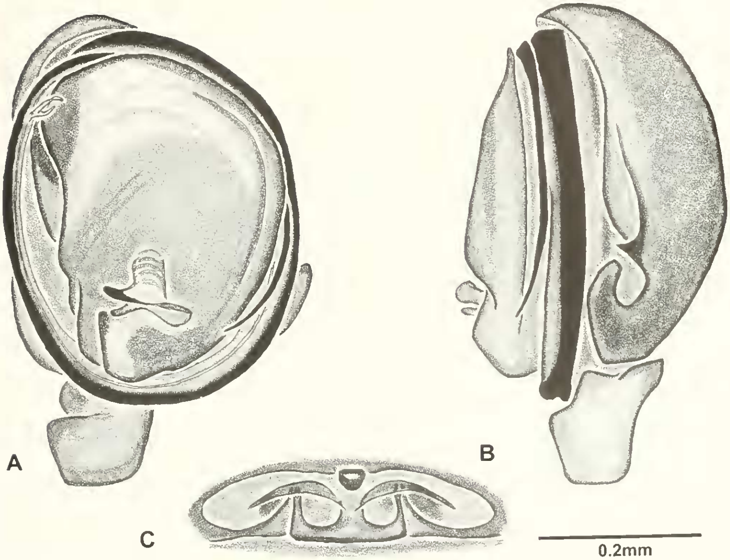


FIGURE 50. Genitalia of *Tekelloides australis* Forster, from Peel Forest, Canterbury. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by CG.

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FIGURE 49. *Tekelloides australis* Forster, right pedipalpus of ♂ from Peel Forest, Canterbury. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A–C = 200 µm, D = 20 µm.

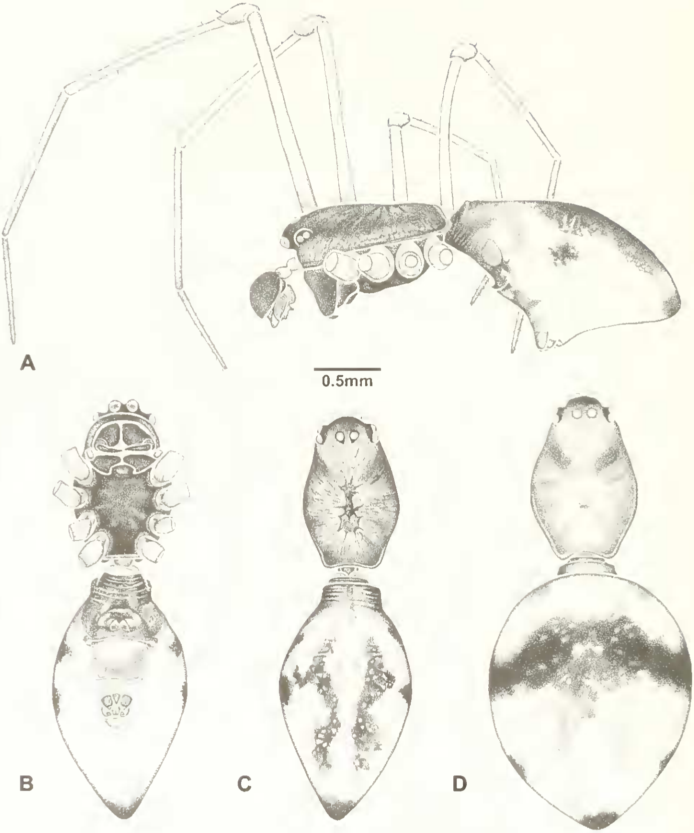


FIGURE 51. *Alaranea* spp. A–C. *A. ardua* Griswold from Marojejy. D. *A. merina* Griswold from Perinét. A. ♂, lateral. B. ♀, ventral. C, D. ♀, dorsal. Illustrations by JS.

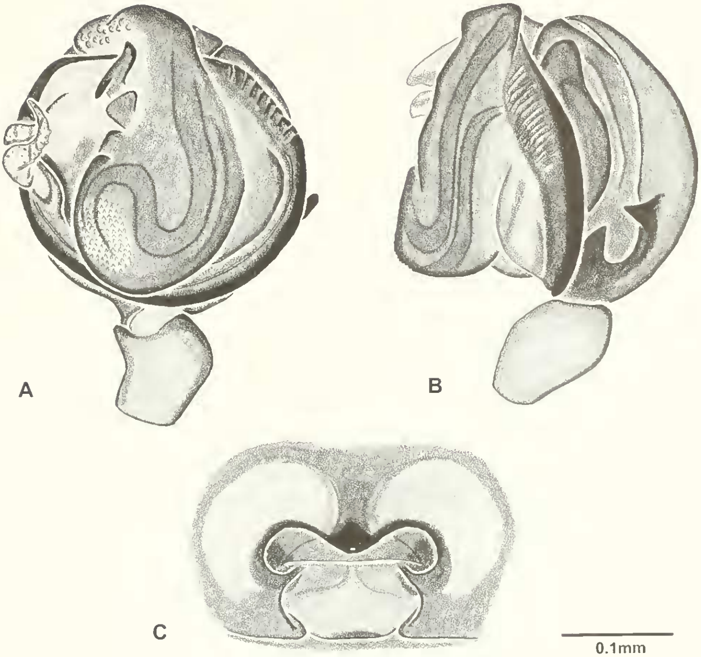


FIGURE 52. Genitalia of *Alaranea betsileo* Griswold, from 7 km W Ranomafana. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by CG.

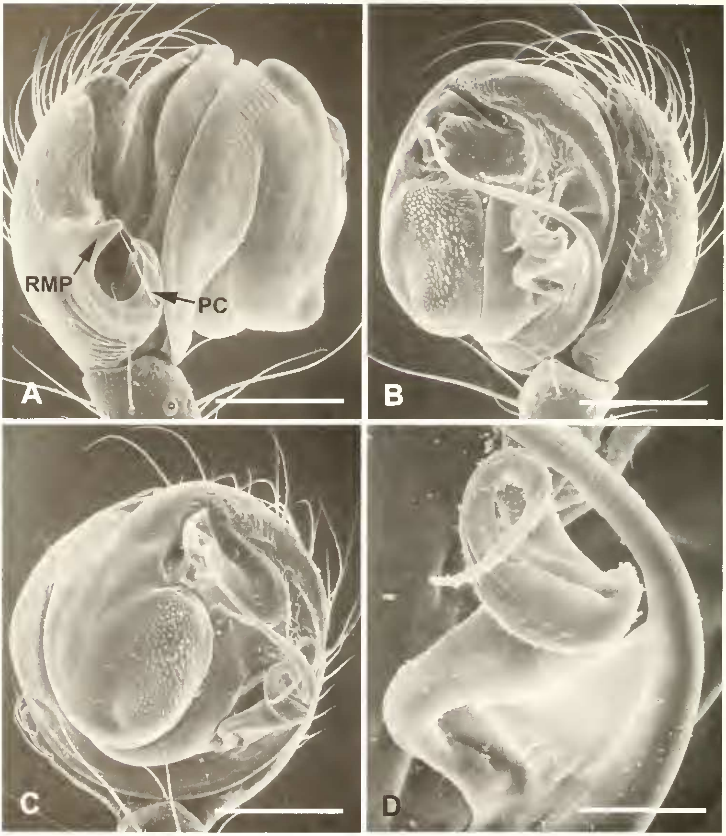


FIGURE 53. *Alaranea merina* Griswold, right pedipalpus of ♂ from Forêt de Didy. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A–C = 100 µm, D = 30 µm.

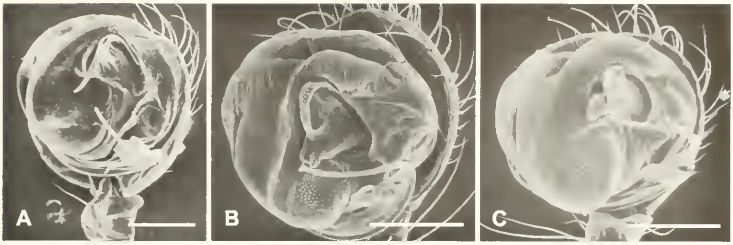


FIGURE 54. *Alaranea* spp., right ♂ pedipalpus, ventral view. A. *A alba* Griswold, holotype. B. *A. ardua*, from Marojejy. C. *A. betsileo*, from Talatekely. Scale bars for A, B = 100 µm; C = 120 µm.

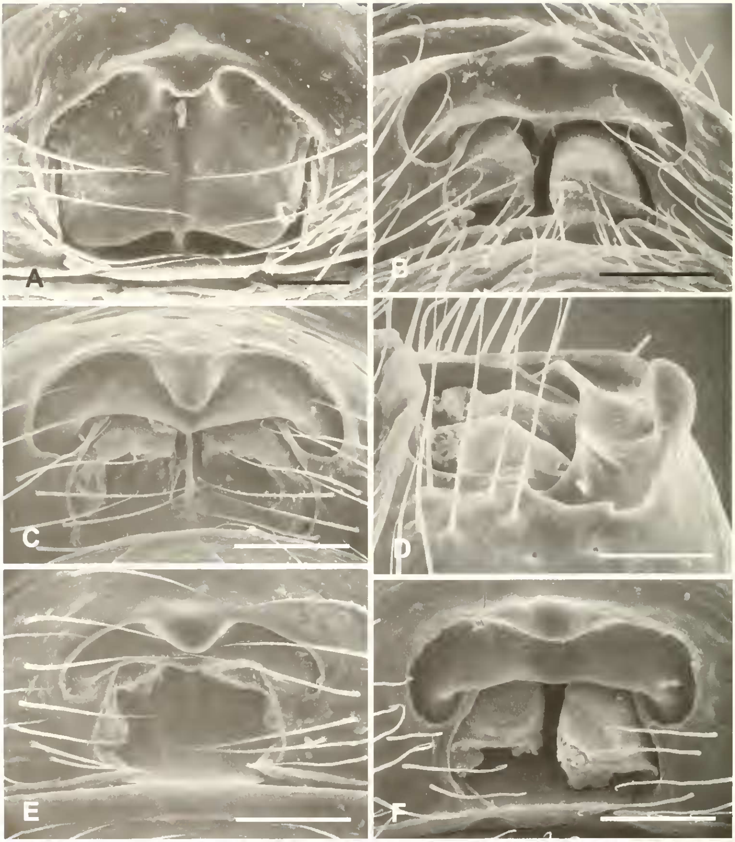


FIGURE 55. *Alaranea* spp., epigynum. A, C, E, F. Ventral. B. Posterior. D. Lateral. A. *A. alba* Griswold, paratype. B, D, F. *A. merina* Griswold, from Ranomafana. C. *A. ardua* Griswold from Marojejy. E. *A. betsileo* Griswold from Talatakely. Scale bars for A = 40 μm; B, C, E, F = 60 μm; D = 43 μm.

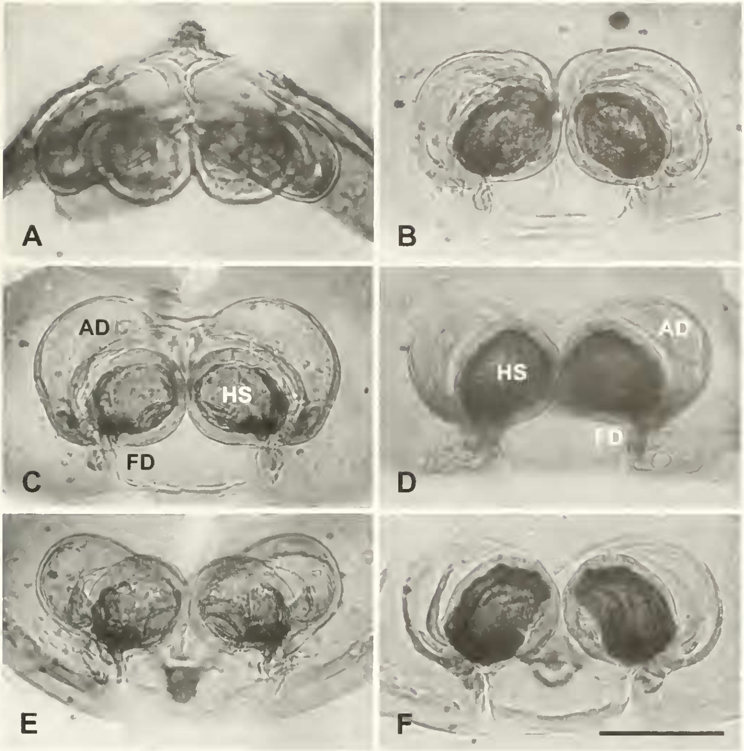


FIGURE 56. *Alaranea* spp., vulva, cleared. A, C, E. *A. ardua* Griswold from Marojejy. B. *A. alba* Griswold, paratype. D. *A. betsileo* Griswold from 7 km W Ranomafana. F. *A. merina* Griswold from Mandraka. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. A. Anterior. B–D, F. Dorsal. E. Posterior. Scale bar = 0.1 mm.

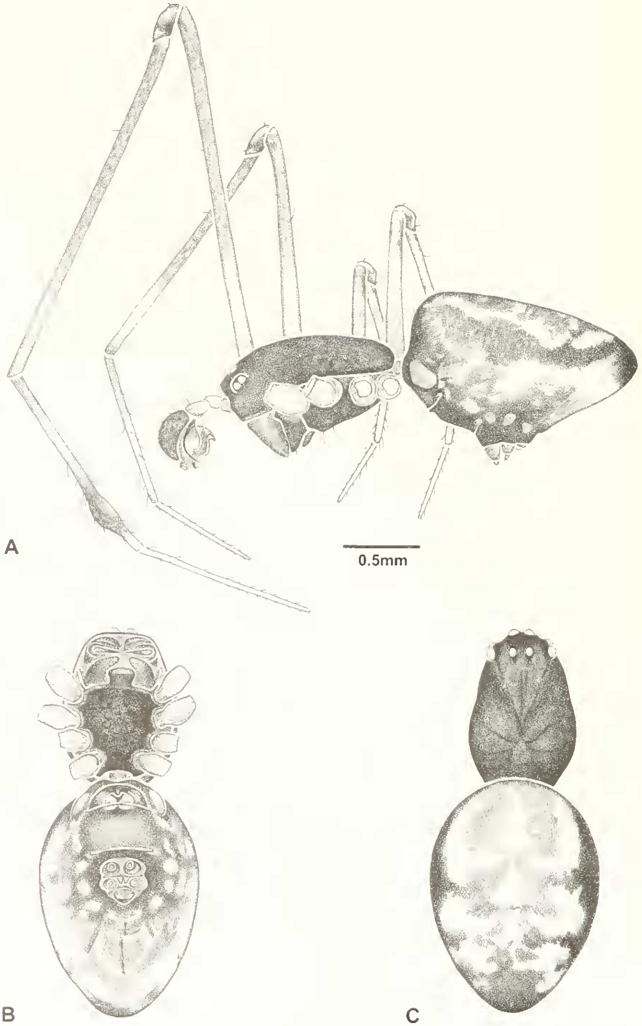


FIGURE 57. *Buibui abyssinica*, new species. A. Holotype ♂, lateral. B. Paratype ♀, ventral. C. Paratype ♀, dorsal. Illustrations by JS.

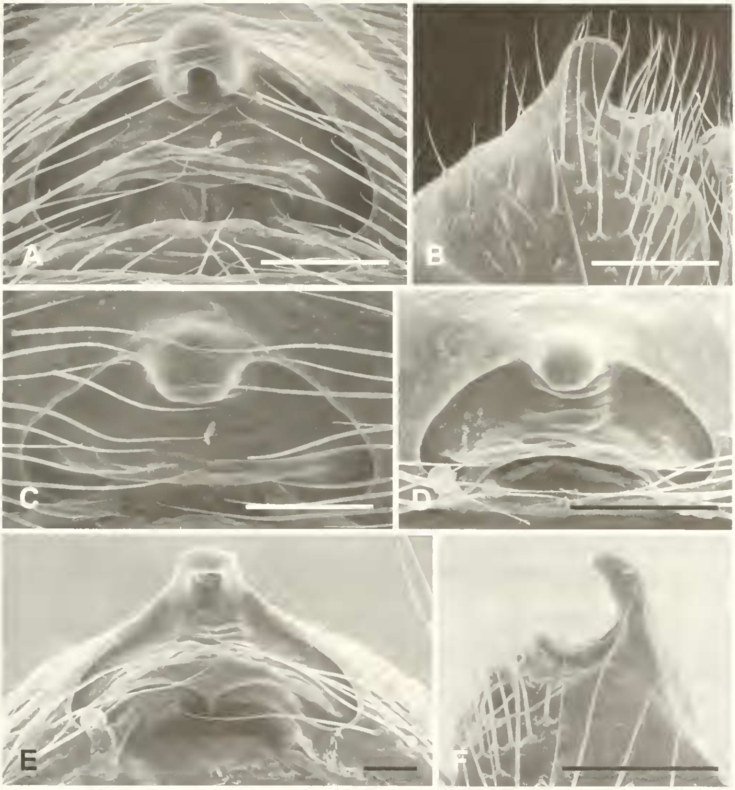


FIGURE 58. Epigyna of *Buibui* spp. A–C. *B. abyssinica*, new species, from Debre Birhan Rd. D–F. *B. cyrtata*, new species, from Kanzuiri. A, E. Posterior. B, F. Lateral. C, D. Ventral. Scale bars for A, C = 60 μm; B = 75 μm; D, F = 100 μm; E = 40 μm.

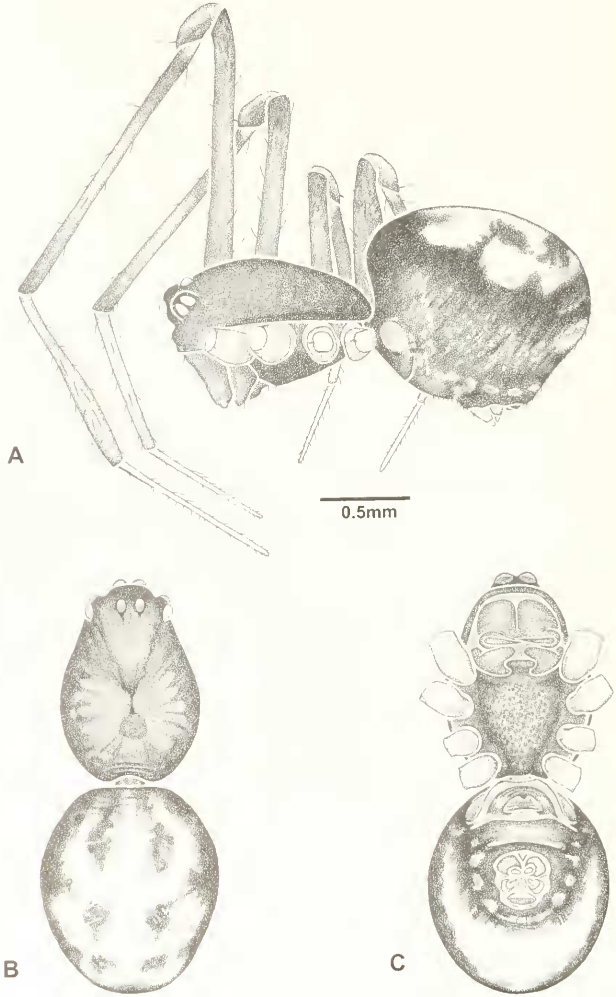


FIGURE 59. *Buibui claviger*, new species. A. Holotype ♂, lateral. B, C. Paratype ♀. B. Dorsal. C. Ventral. Illustrations by JS.

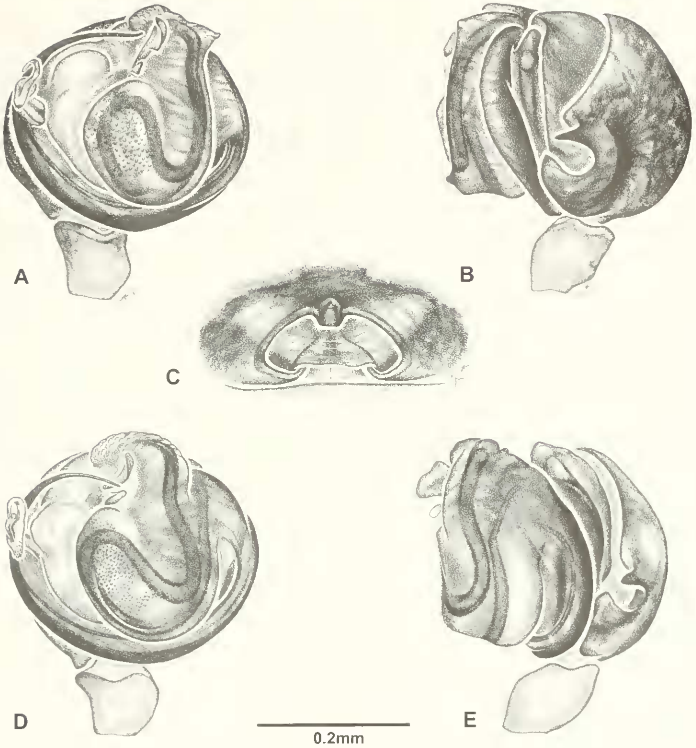


FIGURE 60. Genitalia of *Buibui* spp. A–C. *B. abyssinica*, new species, from Debre Birhan Rd. D, E. *B. orthoskelos*, new species, holotype. A, B, D, E. Left ♂ pedipalpus. C. Epigynum. A, C, D. Ventral. B, E. Retrolateral. Illustrations by JS.

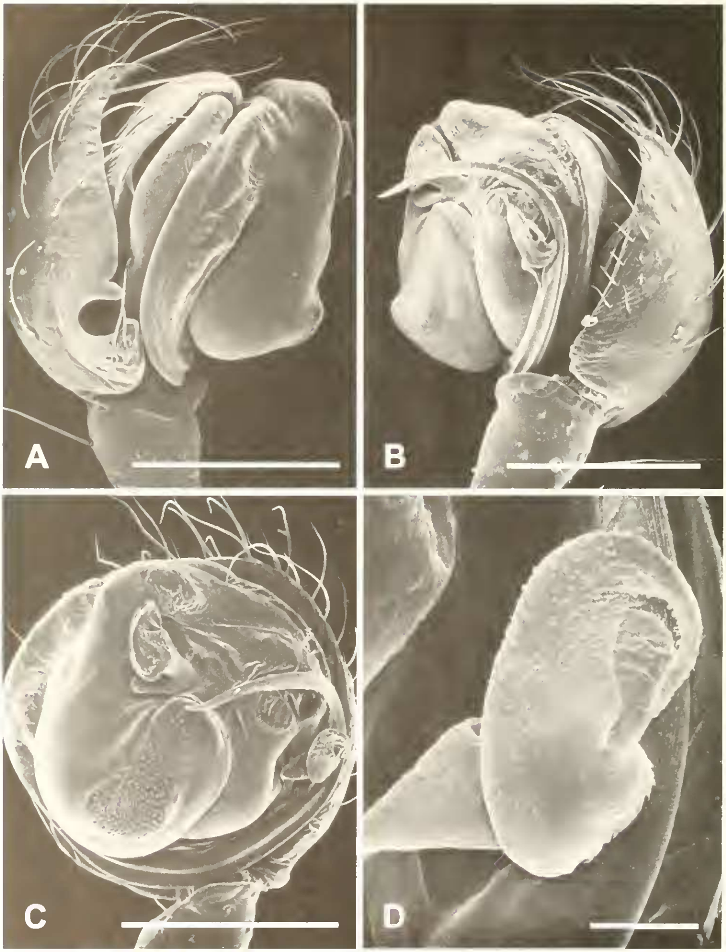


FIGURE 61. *Buibui claviger*, new species, right pedipalpus of holotype ♂. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 20 μm.

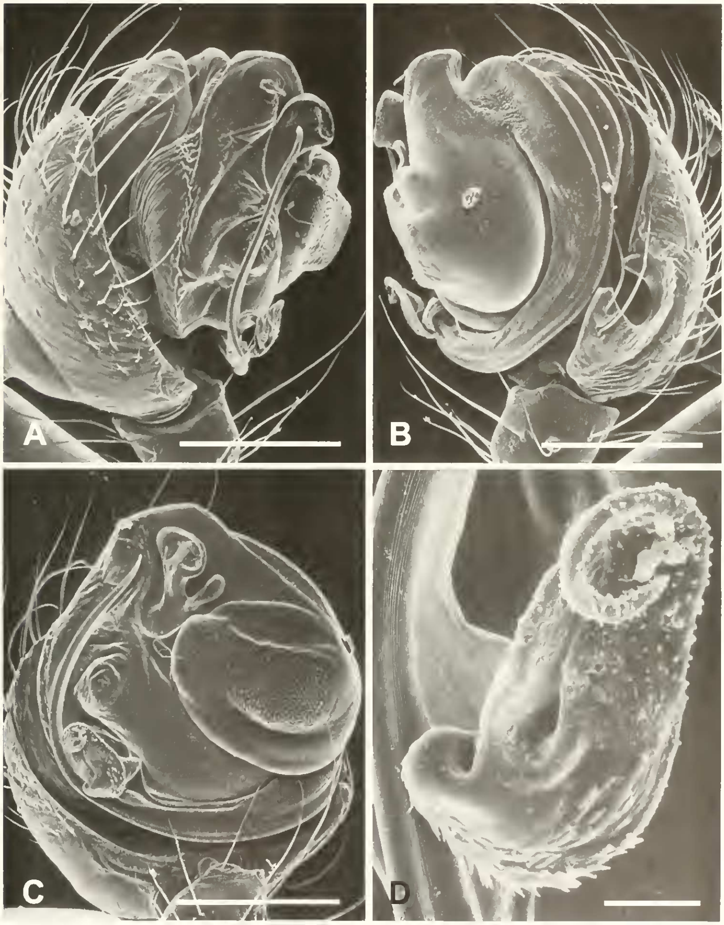


FIGURE 62. *Buibui cyrtata*, new species, right pedipalpus of holotype ♂. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 20 μm.

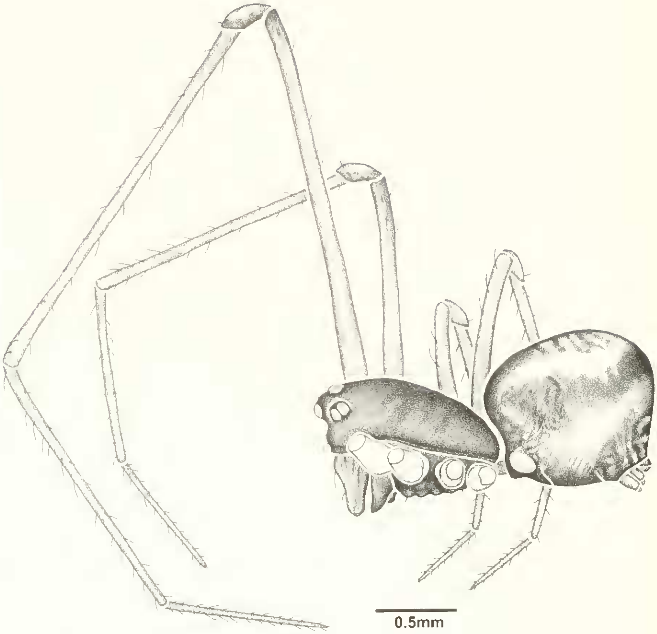


FIGURE 63. *Buibui kankamelos*, new species, holotype ♂. Illustration by JS.

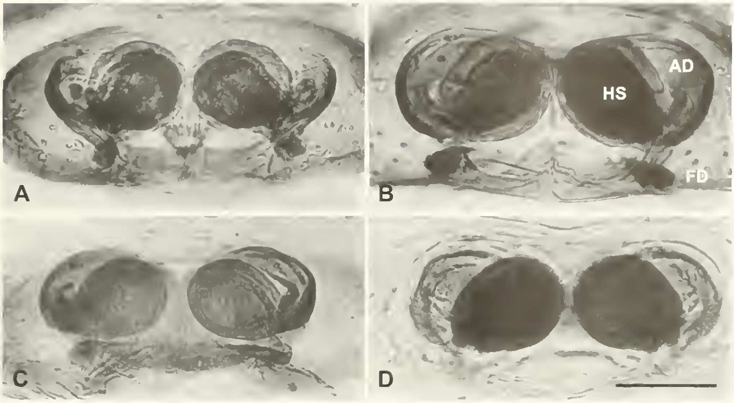


FIGURE 64. *Buibui* spp., dorsal views of cleared ♀ vulvae. A. *B. claviger*, new species, from Kabaru Forest Station. B. *B. cyrtata*, new species, from Bujuku Valley, Bigo. C. *B. kankamelos*, new species, paratype. D. *B. orthoskelos*, new species, paratype. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

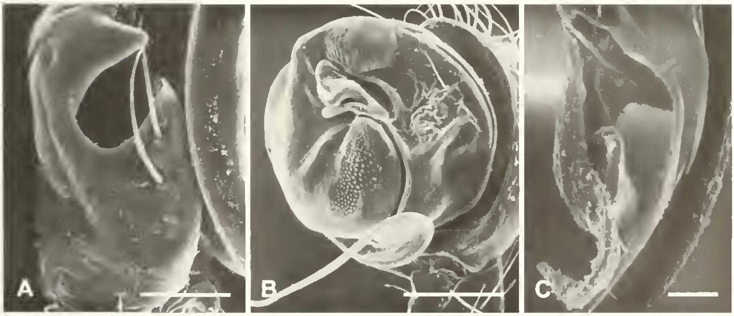


FIGURE 65. *Buibui kankamelos*, new species, holotype ♂, right pedipalpus. A. Retrolateral view of PC. B. Ventral. C. Paremboli process. Scale bars for A = 40 µm, B = 100 µm, C = 10 µm.

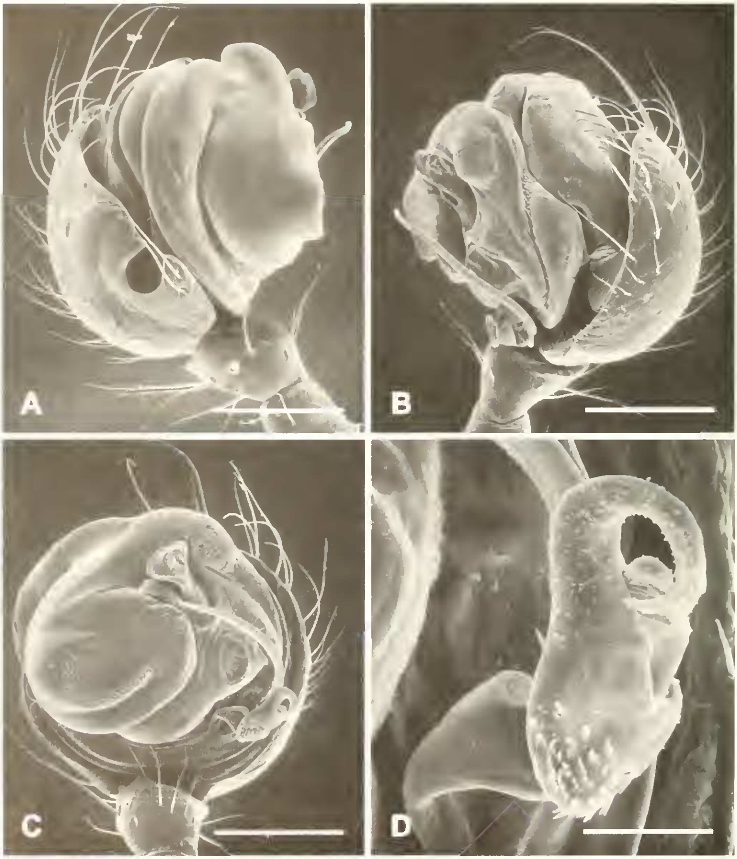


FIGURE 66. *Buibui orthoskelos*, new species, right pedipalpus of ♂ from Mt. Lubwe. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 150 μm, D = 30 μm.

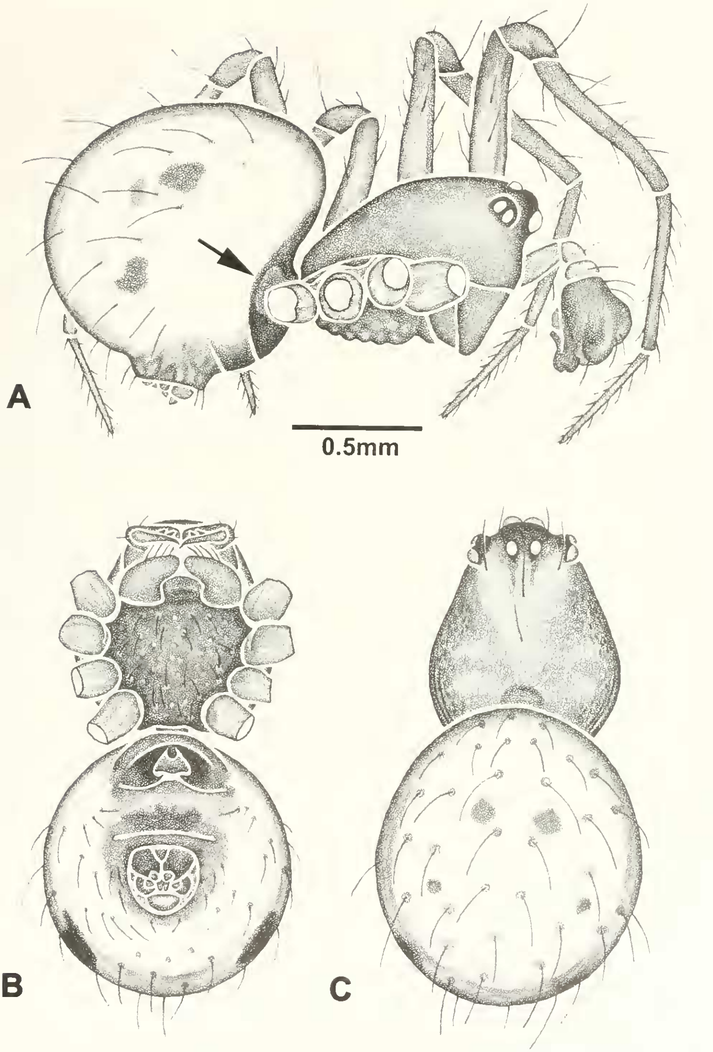


FIGURE 67. *Cyatholipus* spp. A. *C. isolatus* Griswold, ♂ from Hanglip Forest, lateral. B, C. *C. avus* Griswold, ♀ from Grootvadersbosch. B. Ventral. C. Dorsal. Arrow to sclerotized ring around pedicel. Illustrations by JS.

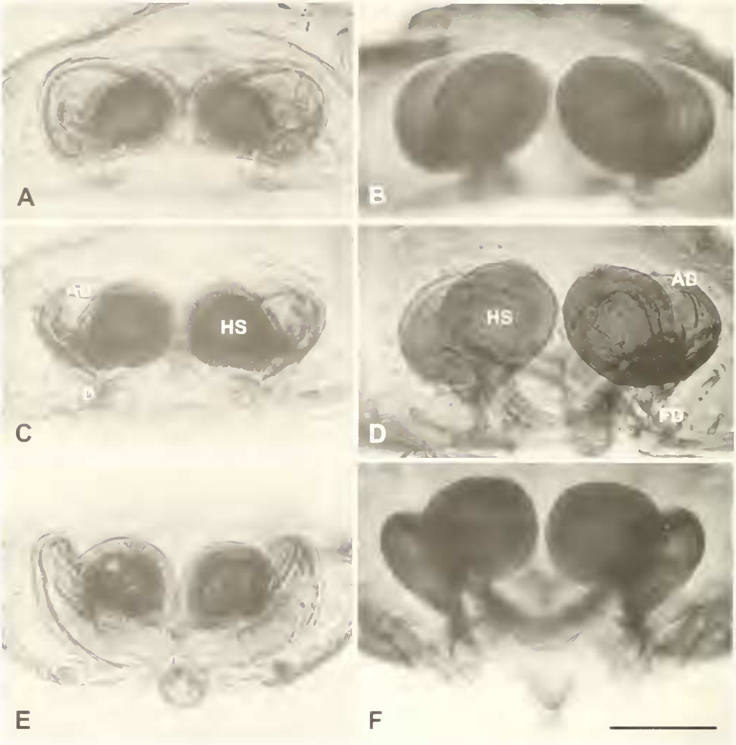


FIGURE 68. Cleared vulvae of Cyatholipidae. A, C, E. *Buibui abyssinica*, new species, from Debre Birhan Rd. B, D, F. *Cyatholipus isolatus* Griswold, holotype. A, B. Anterior. C, D. Dorsal. E, F. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

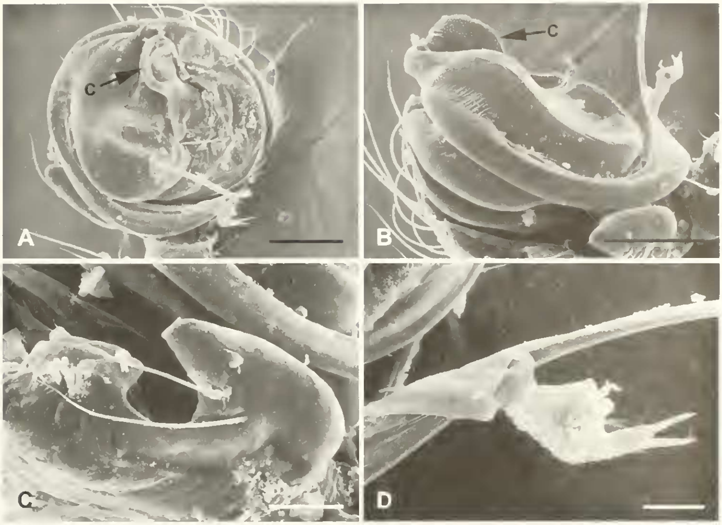


FIGURE 69. *Cyatholipus isolatus* Griswold, right pedipalpus of ♂ from Hanglip Forest. A. Ventral. B. Retrolateral. C. Retrolateral view of PC and RMP. D. Parembolic process. C = conductor. Scale bars for A, B = 100 μm; C = 40 μm; D = 20 μm.

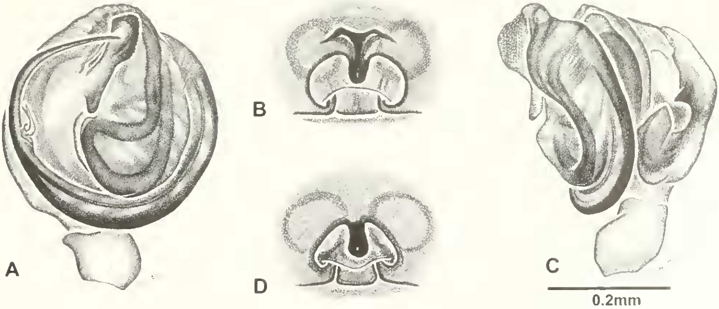
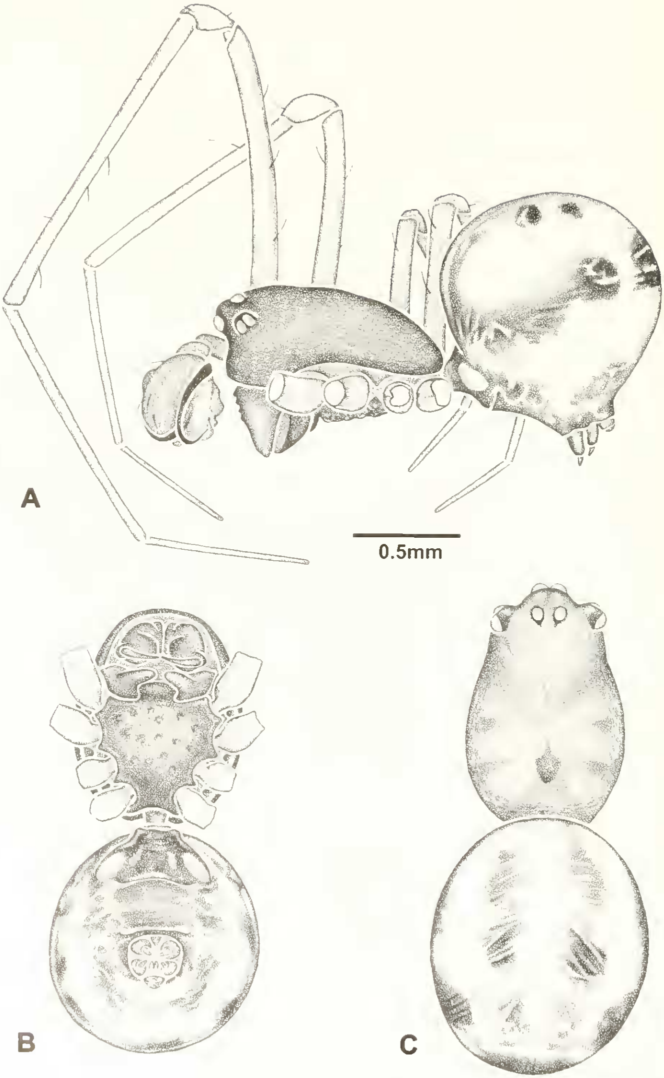


FIGURE 70. Genitalia of *Cyatholipus* spp. A, C. *C. isolatus* Griswold, ♂ from Hanglip Forest, left pedipalpus. B. *C. isolatus* Griswold, holotype, epigynum. D. *C. avus* Griswold, ♀ from Grootvadersbosch, epigynum. A, B, D. Ventral. C. Retrolateral. Illustrations A and C by JS, B and D by CG.


A
0.5mm
B
C

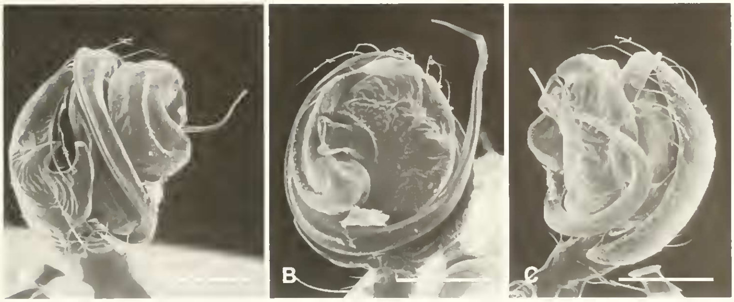


FIGURE 72. *Ilisoa conjugalis*, new species, right pedipalpus of ♂ from Buffels Bay. A. Retrolateral. B. Ventral. C. Prolateral. Scale bars for A–C = 150 μm.

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FIGURE 71. *Ilisoa conjugalis*, new species, holotype ♂. A. Lateral. B. Ventral. C. Dorsal. Illustrations by JS.

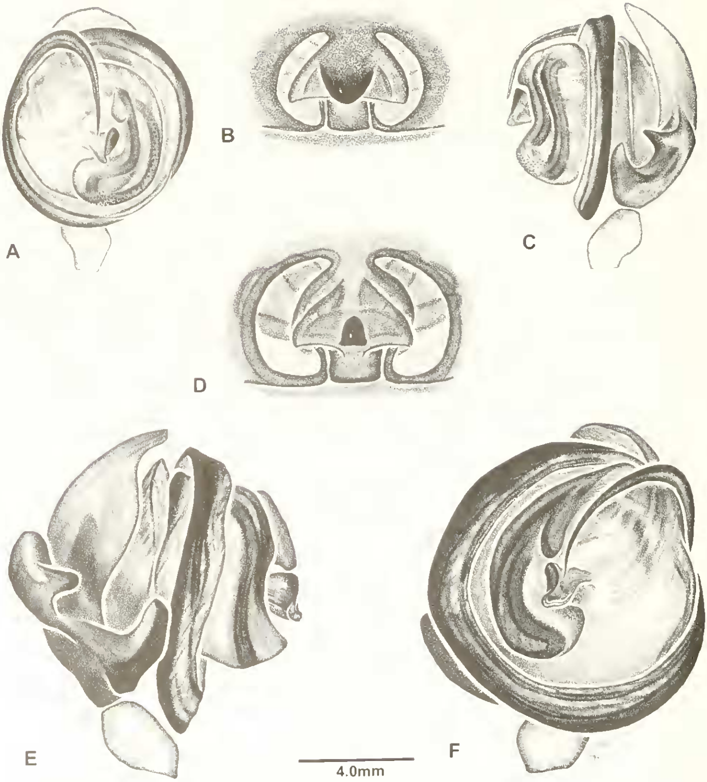

FIGURE 73. Genitalia of *Ilisoa* spp. A, C. *I. conjugalis*, new species, ♂ from Buffels Bay, left pedipalpus. B. *I. hawequas* Griswold, holotype ♀, epigynum. D. *I. conjugalis*, new species, ♀ from Kalk Bay, epigynum. E, F. *I. knysna* Griswold, holotype ♂, right pedipalpus. A, B, D, F. Ventral. C, E. Retrolateral. Illustrations A, C, E and F by JS; B and D by CG.

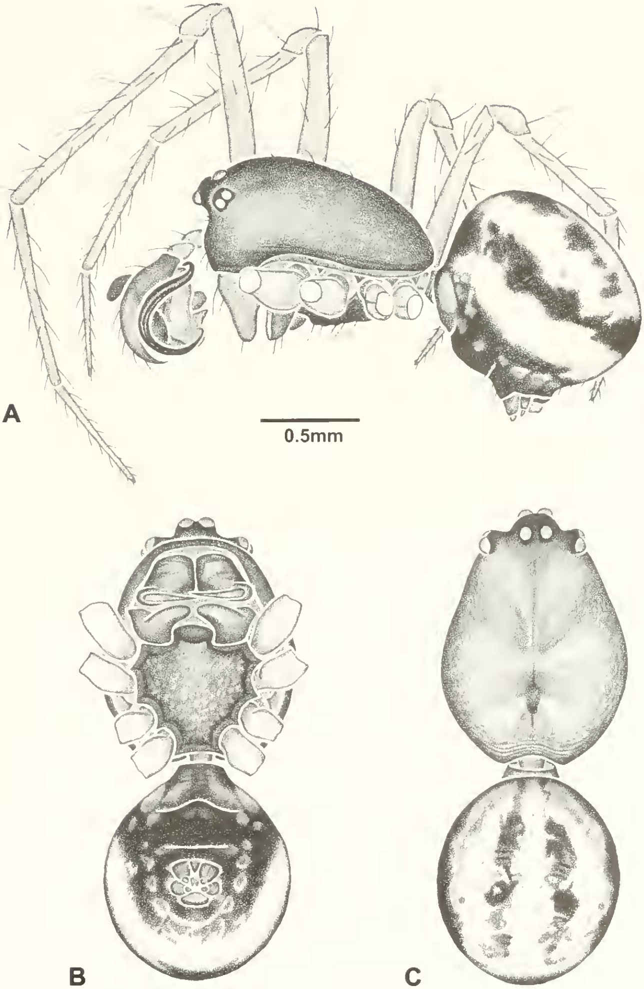

FIGURE 74. *Ilisoa knysna* Griswold, holotype ♂. A. Lateral. B. Ventral. C. Dorsal. Illustrations by JS.

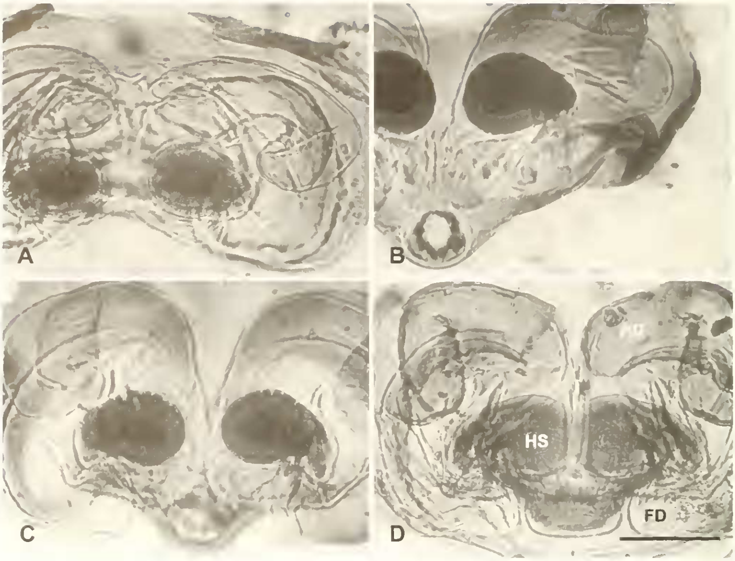

FIGURE 75. Cleared vulvae of *Ilisoa* spp. A–C. *I. conjugalis*, new species, ♀ from Kalk Bay. D. *I. hawequas* Griswold, holotype ♀. A. Anterior. B Posterior. C, D. Dorsal. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

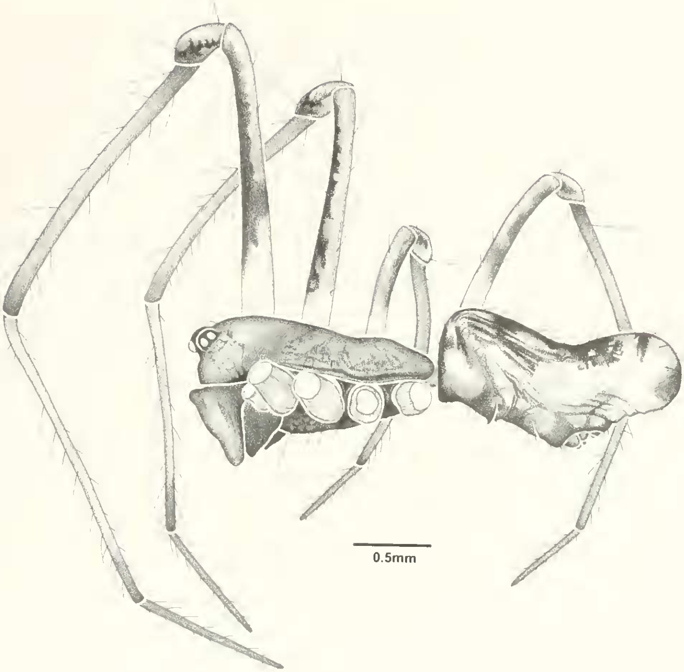

FIGURE 76. *Isicabu henriki*, new species, holotype ♂, lateral. Illustration by JS.

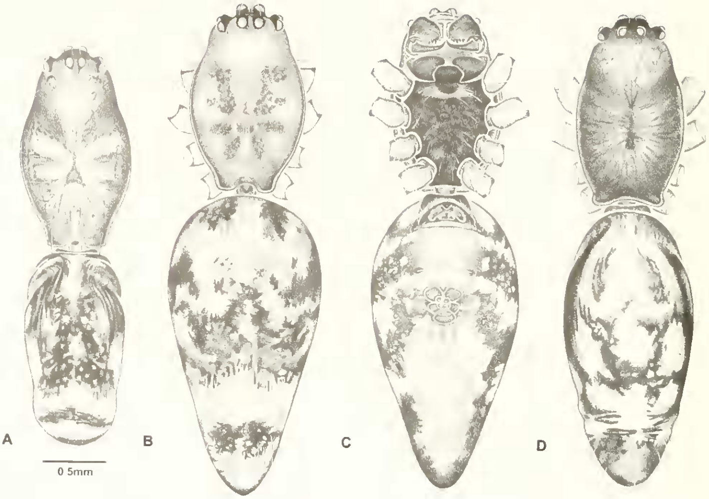

FIGURE 77. *Isicabu* spp. A. *I. henriki*, new species, holotype ♂, dorsal. B. *I. kombo*, new species, paratype ♀, dorsal. C. *I. kombo*, new species, paratype ♀, ventral. D. *I. margrethae*, new species, ♀ from Kihanga Stream, dorsal. Illustrations by JS.

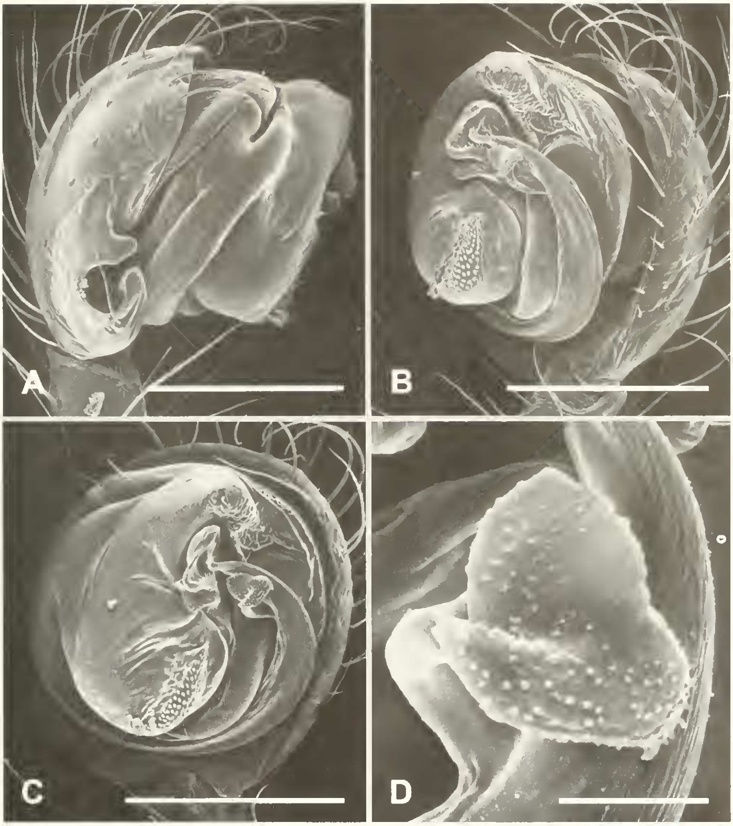

FIGURE 78. *Isicabu henriki*, new species, right pedipalpus of holotype ♂. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 20 μm.

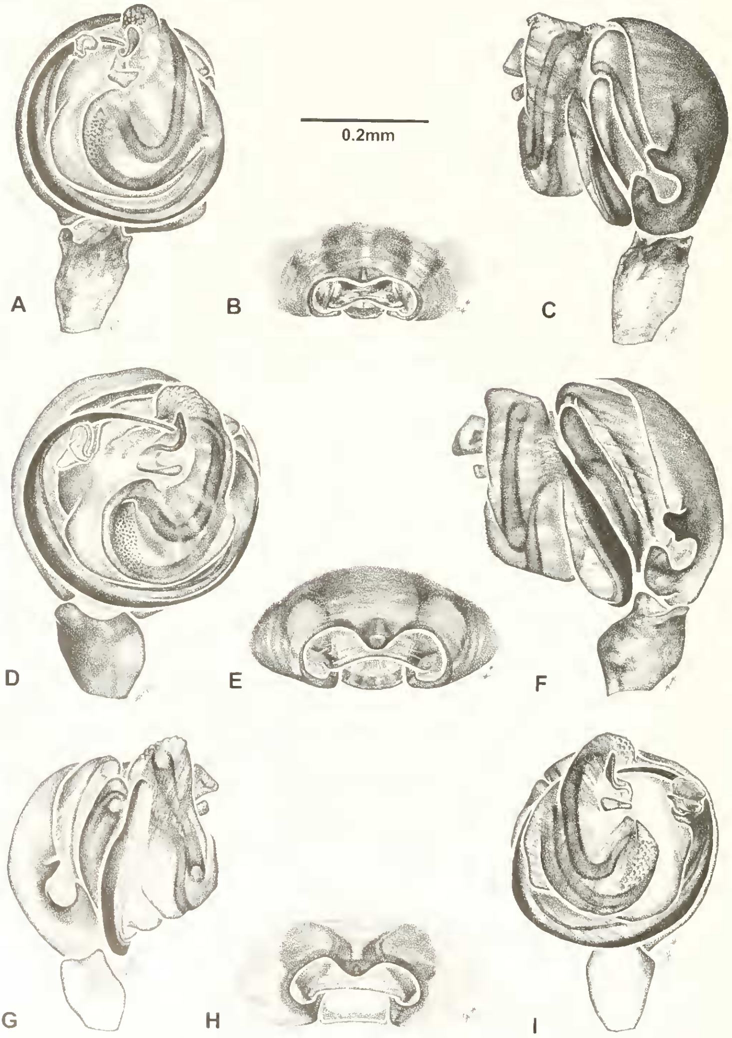

FIGURE 79. Genitalia of *Isicabu* spp. A, C. *I. henriki*, new species, holotype ♂, left pedipalpus. B. *I. henriki*, new species, paratype ♀, epigynum. D, F. *I. kombo*, new species, left pedipalpus of ♂ from Mazumbai. E. *I. kombo*, new species, ♀ from Mbomole, Amani, epigynum. G, I. *I. reavelli* Griswold, right pedipalpus of holotype ♂. H. *I. reavelli* Griswold, epigynum of paratype ♀. A, B, D, E, H, I. Ventral. C, F, G. Retrolateral. Illustrations by JS.

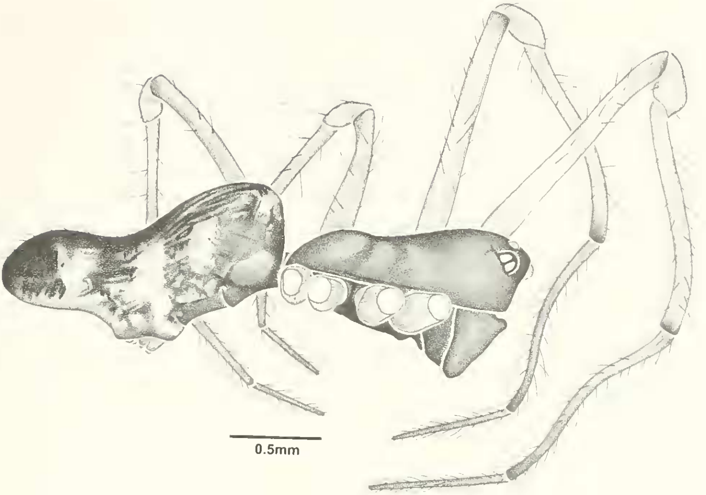

FIGURE 80. *Isicabu kombo*, new species, ♂ from Mazumbai, lateral. Illustration by JS.

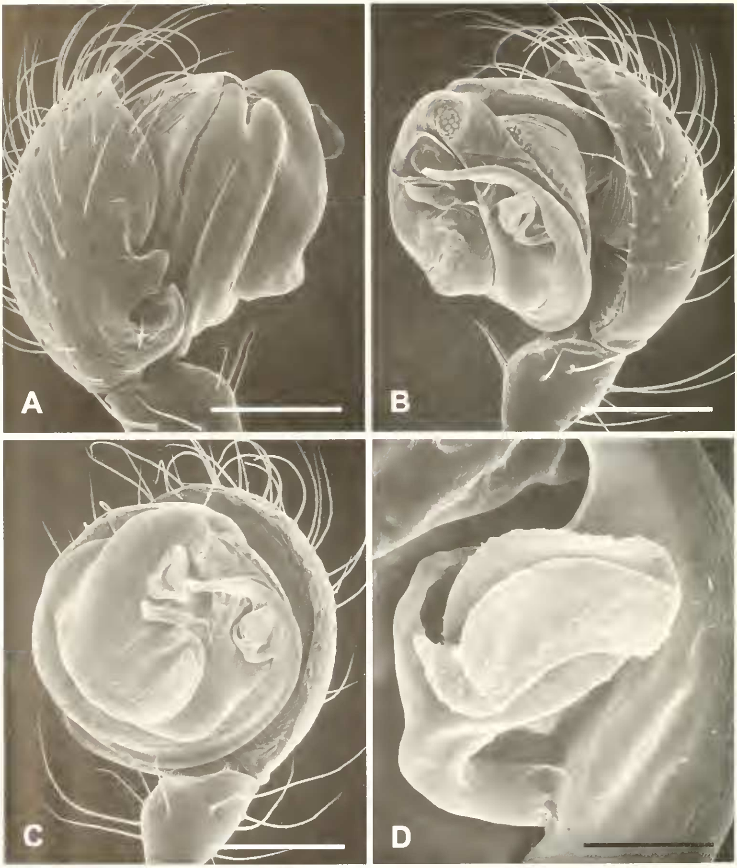

FIGURE 81. *Isicabu kombo*, new species, right pedipalpus of ♂ from Amani. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 120 µm, D = 20 µm.

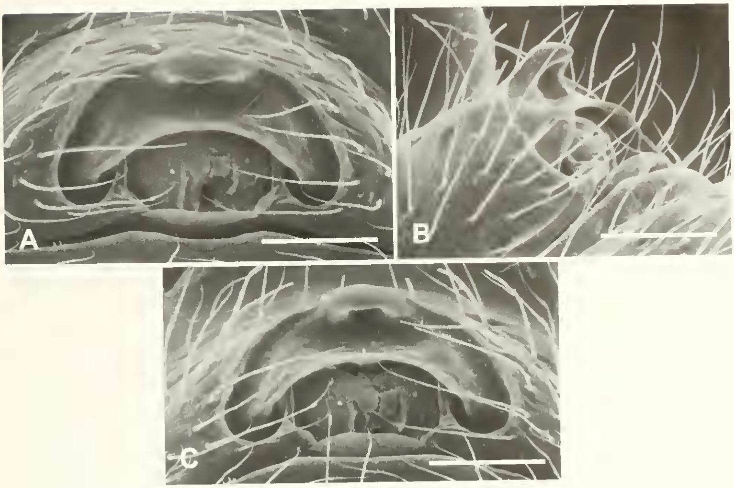

FIGURE 82. *Isicabu kombo*, new species, Amani, ♀ epigynum. A. Ventral. B. Lateral. C. Posterior. Scale bars for A–C = 75 μm.

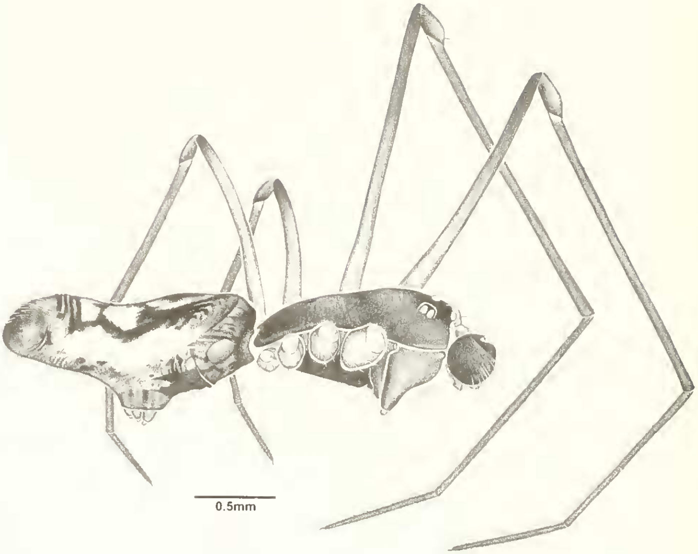

FIGURE 83. *Isicabu margrethae*, new species, ♂ from Kihanga Stream, lateral. Illustration by JS.

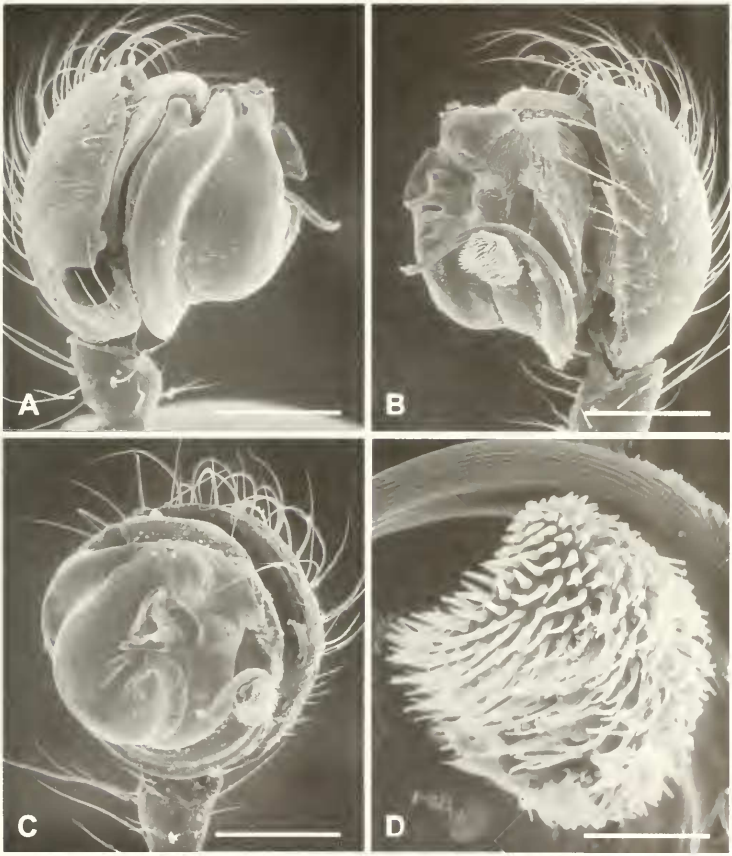

FIGURE 84. *Isicabu margrethae*, new species, ♂ from Kihanga Stream, right pedipalpus. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 150 µm, D = 25 µm.

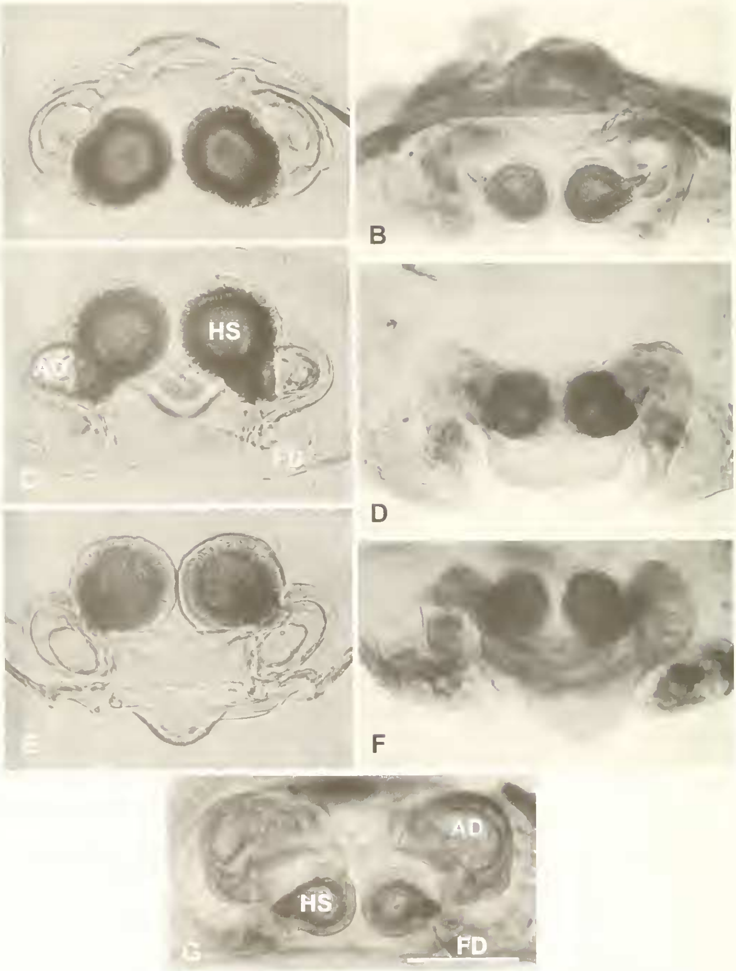

FIGURE 85. Cleared vulvae of *Isicabu* spp. A, C, F. *I. kombo*, new species, ♀ from Mbomole, Amani. B, D, F. *I. henriki*, new species, ♀ from Mwanihana Forest. G. *I. margrethae*, new species, ♀ from Kihanga Stream. A, B. Anterior. C, D, G. Dorsal. E, F. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm

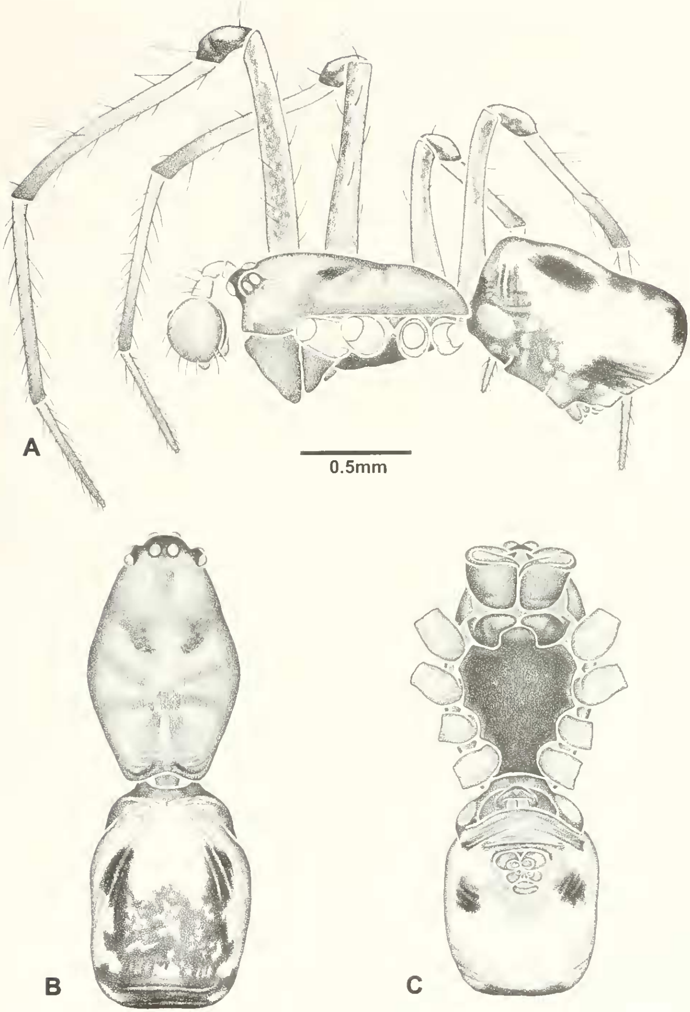

FIGURE 86. *Isicabu reavelli* Griswold. A. Holotype ♂, lateral. B. Paratype ♀, dorsal. C. Paratype ♀, ventral. Illustrations by JS.

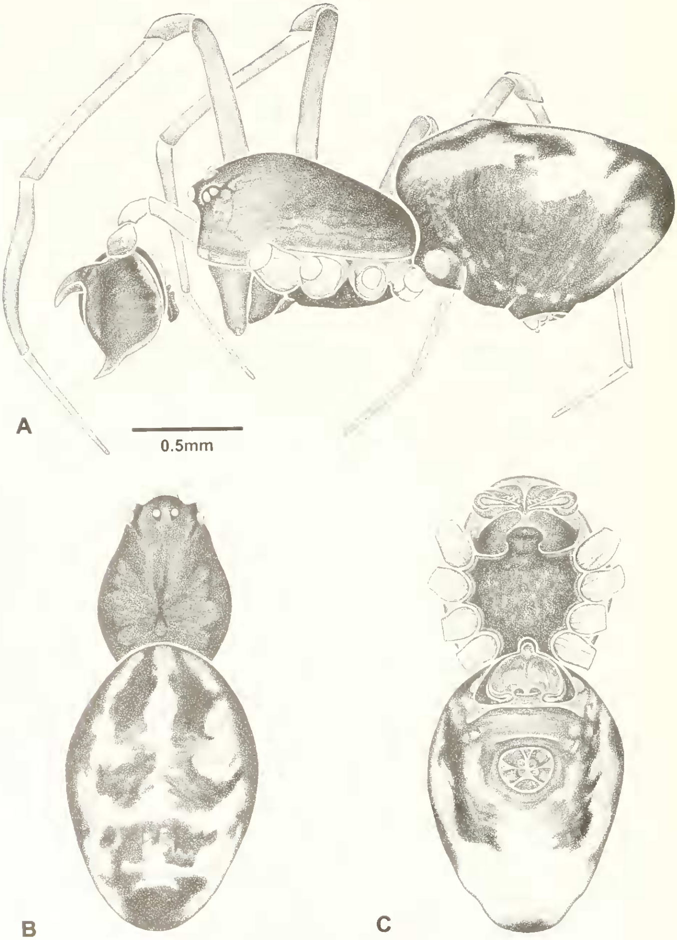

FIGURE 87. *Kubwa singularis*, new species, from Bismark Hut. A. ♂, lateral. B. ♀, dorsal. C. ♀, ventral. Illustrations by JS.

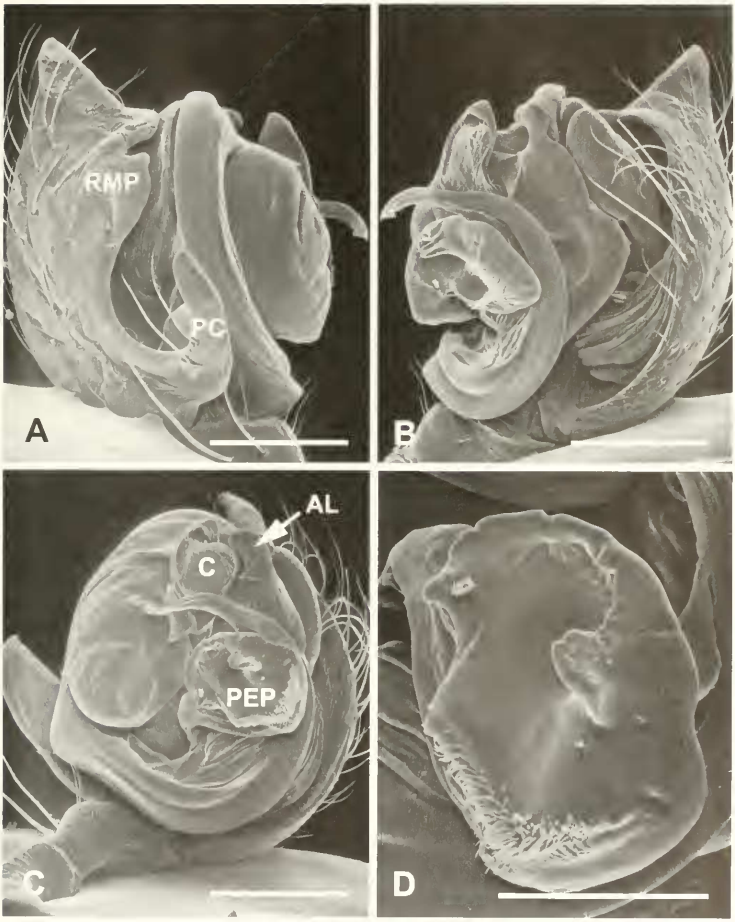

FIGURE 88. *Kubwa singularis*, new species, right pedipalpus of ♂ from Bismark Hut. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. AL = apical lobe of tegulum, C = conductor, PC = paracymbium, PEP = parembolic process, RMP = retromedian cymbial process. Scale bars for A–C = 200 μm, D = 100 μm.

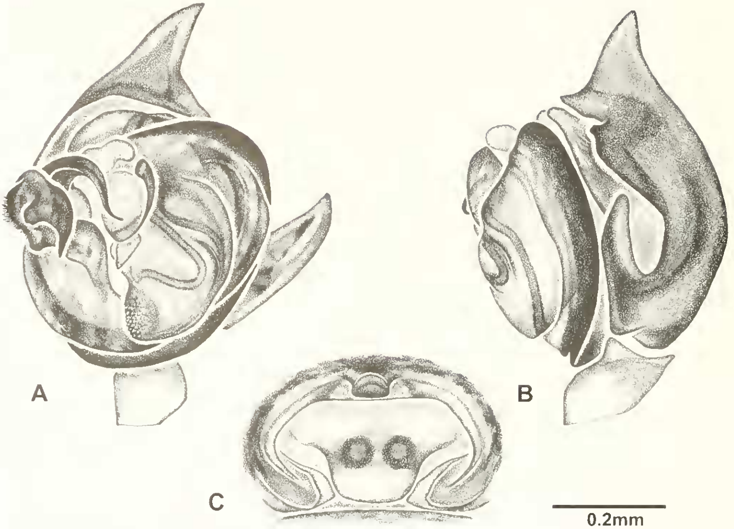

FIGURE 89. Genitalia of *Kubwa singularis*, new species, specimens from Bismark Hut. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

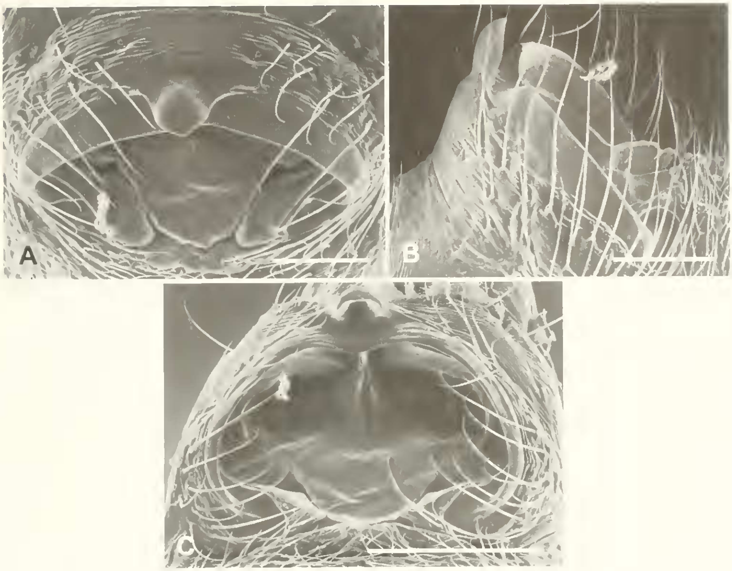

FIGURE 90. *Kubwa singularis*, new species, epigynum of ♀ from Bismark Hut. A. Ventral. B. Lateral. C. Posterior. Scale bars for A, B = 100 µm; C = 200 µm.

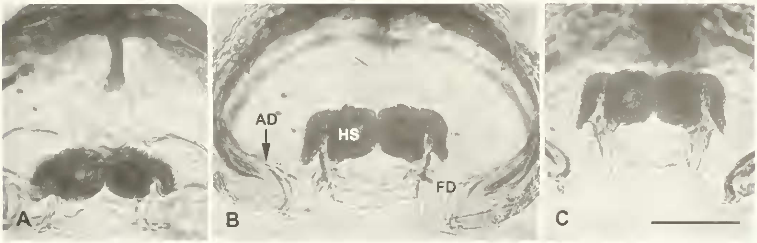

FIGURE 91. Cleared vulva of *Kubwa singularis*, new species, ♀ paratype. A. Anterior. B. Dorsal. C. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

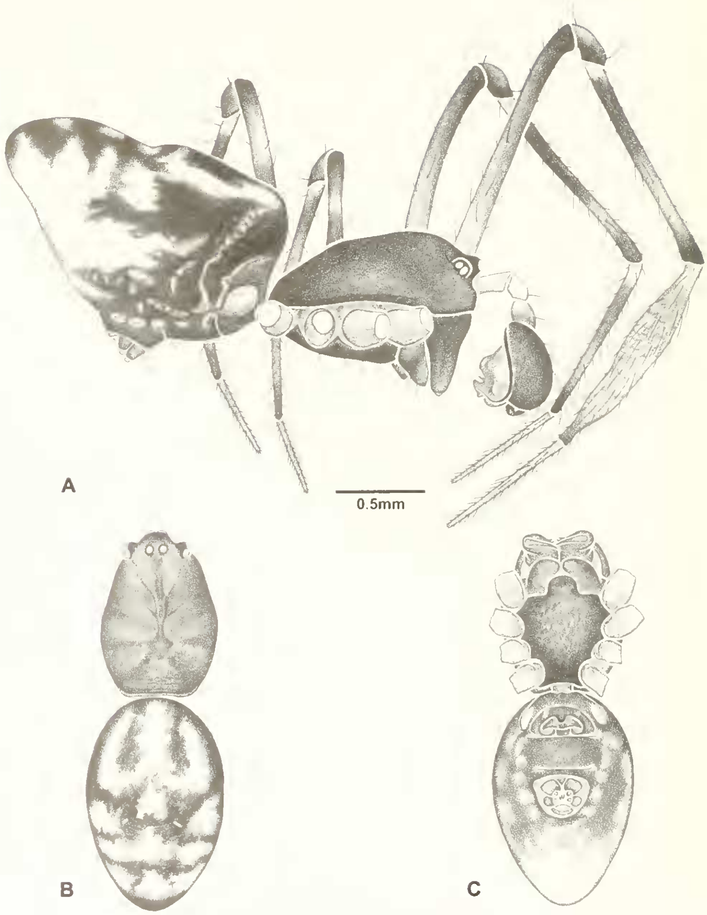

FIGURE 92. *Pembatatu* spp. A. *P. mafuta*, new species, ♂ from east side of Mt. Elgon. B, C. *P. gongo*, new species, ♀ from Mt. Kenya. A. Lateral. B. Dorsal. C. Ventral. Illustrations by JS.

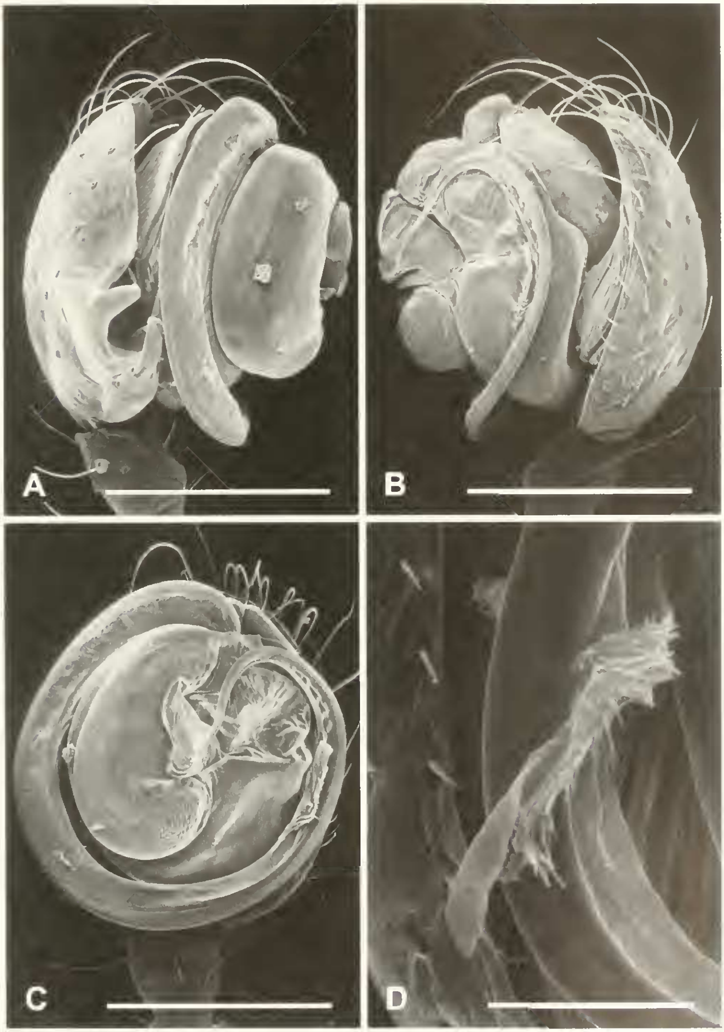

FIGURE 93. *Pembatatu embamba*, new species, right ♂ pedipalpus. A–C. Holotype. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process of ♂ from Aberdares. Scale bars for A–C = 200 μm, D = 50 μm.

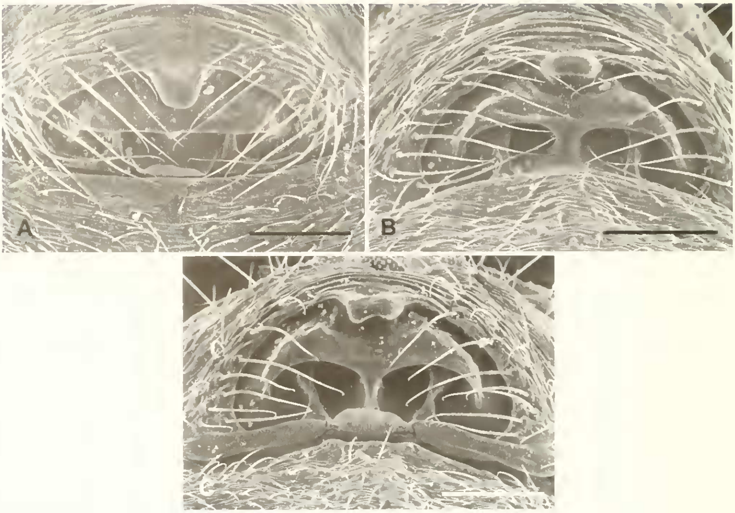

FIGURE 94 *Pembatatu* spp., epigyna. A, B. *P. embamba*, new species, ♀ from Aberdares. C. *P. mafuta*, new species, ♀ from Mt. Elgon. A. Ventral. B, C. Posterior. Scale bars = 100 µm.

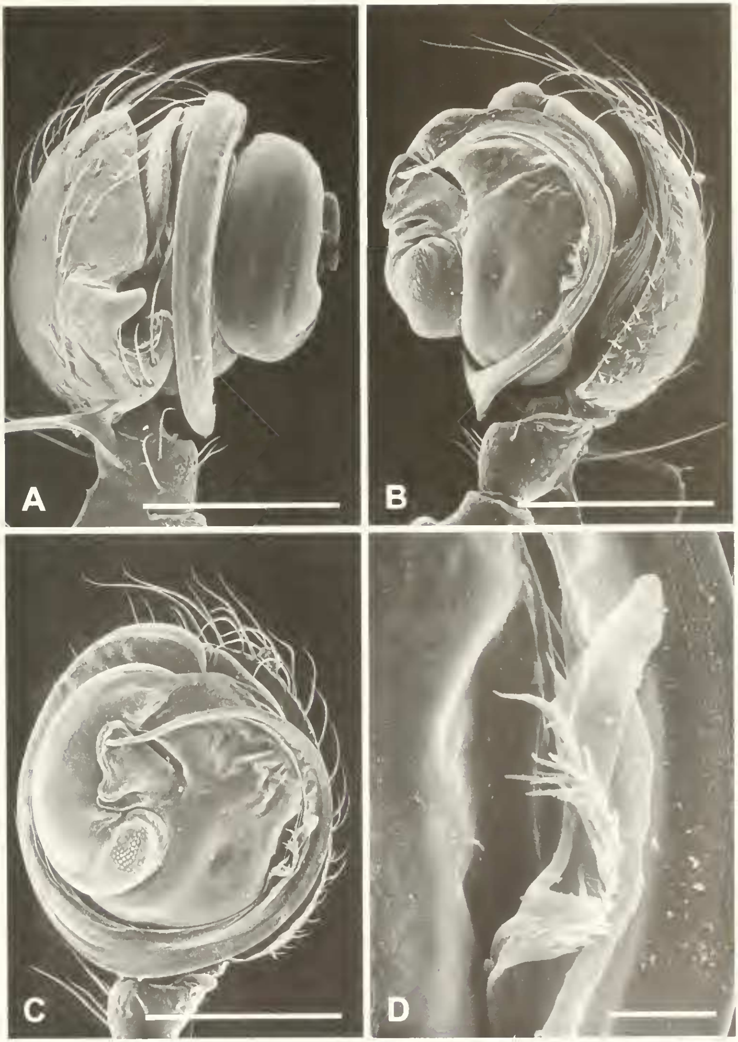

FIGURE 95. *Pembatatu gongo*, new species, right pedipalpus of ♂ from Mt. Kenya. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 20 μm.

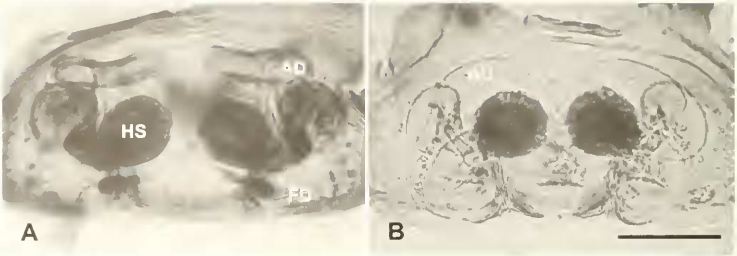

FIGURE 96. Cleared vulvae of *Pembatatu* spp., dorsal view. A. *P. mafuta*, new species, ♀ from Mt. Elgon. B. *P. gongo*, new species, ♀ from Mt. Kenya. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

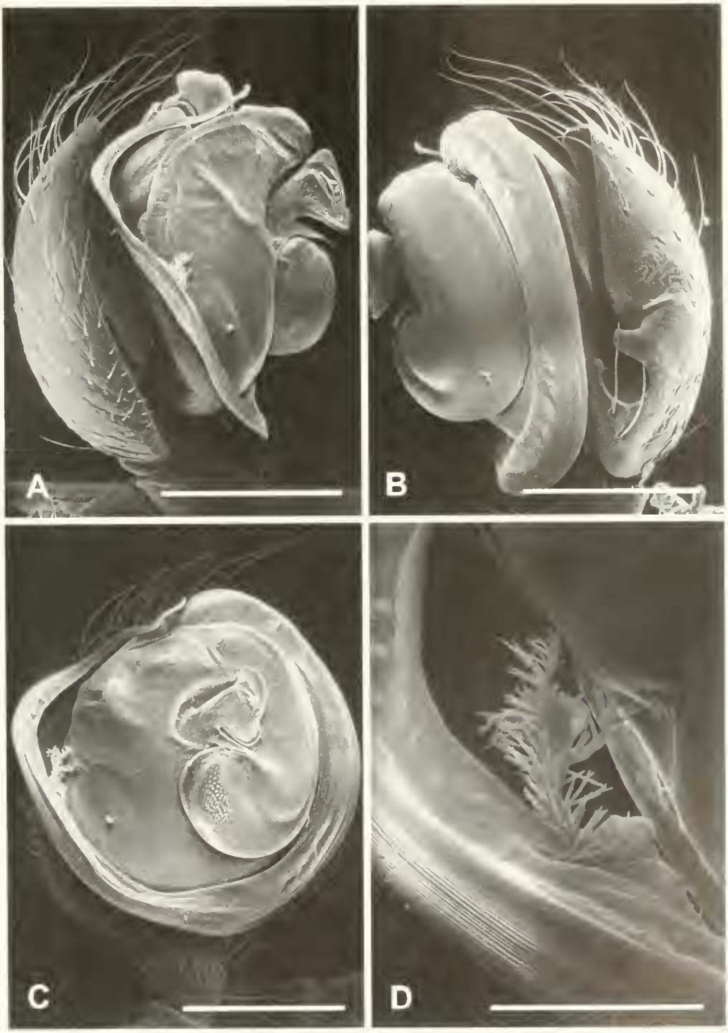

FIGURE 97. *Pembatatu mafuta*, new species, right pedipalpus of paratype ♂. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 50 μm.

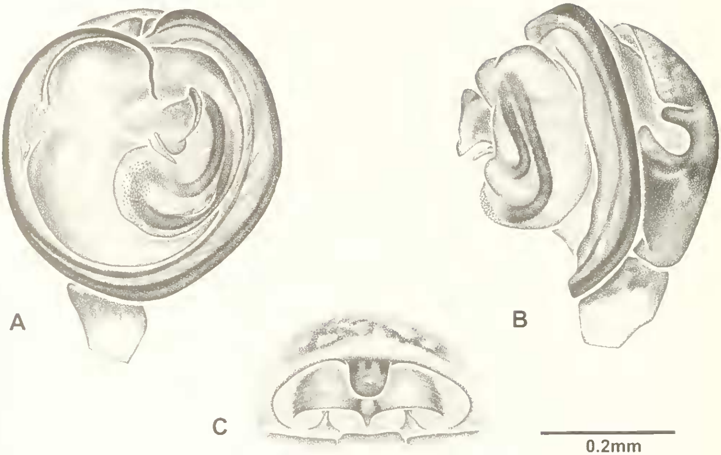

FIGURE 98. Genitalia of *Pembatatu mafuta*, new species, paratypes. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

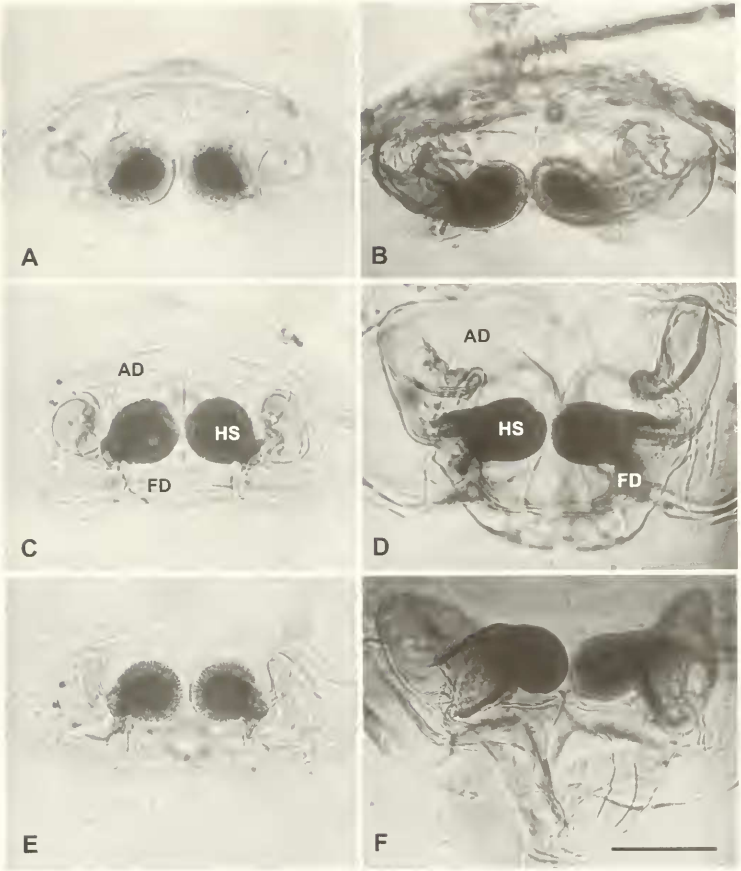

FIGURE 99. Cleared vulvae of Cyatholipidae. A, C, E. *Pembatatu embamba*, new species, paratype ♀. B, D, F. *Pokennips dentipes* (Simon), ♀ from Buffels Bay. A, B. Anterior. C, D. Dorsal. E, F. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

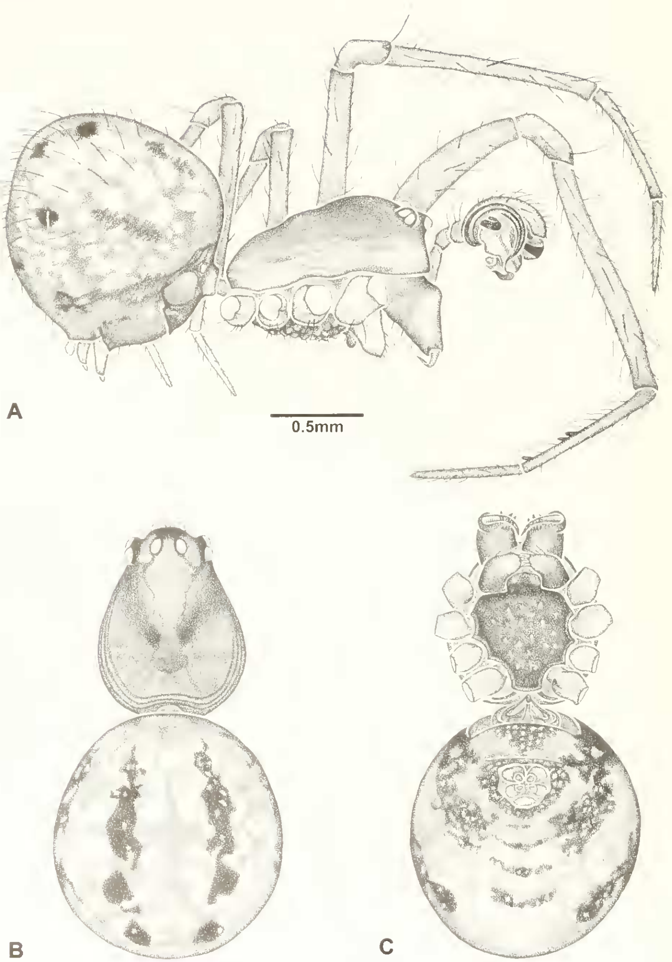

FIGURE 100. *Pokennips dentipes* (Simon), from Buffels Bay. A. ♂, lateral. B. ♀, dorsal. C. ♀, ventral. Illustrations by JS.

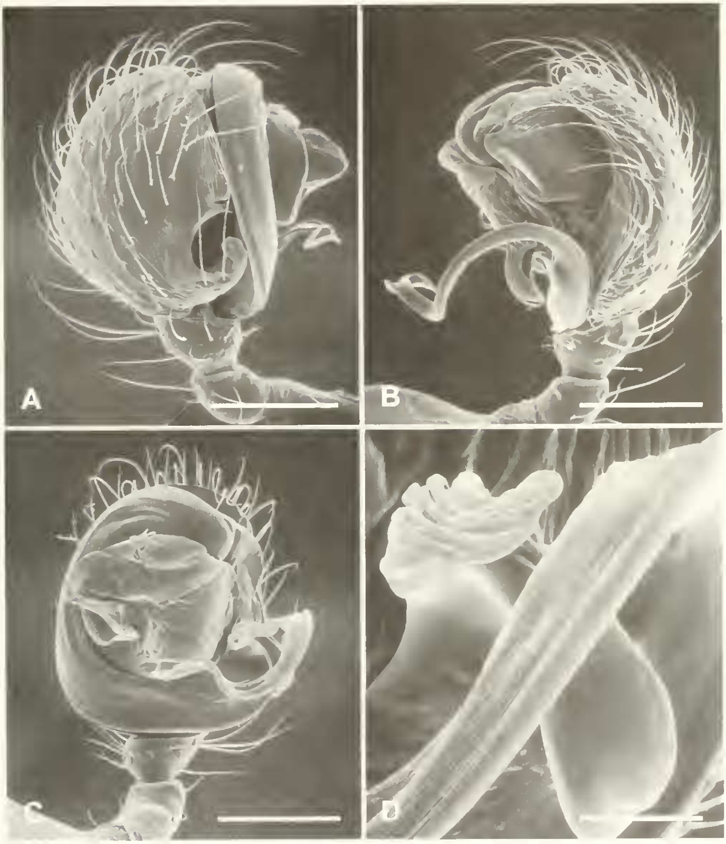

FIGURE 101. *Pokennips dentipes* (Simon), right pedipalpus of ♂ from Buffels Bay. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 µm, D = 43 µm.

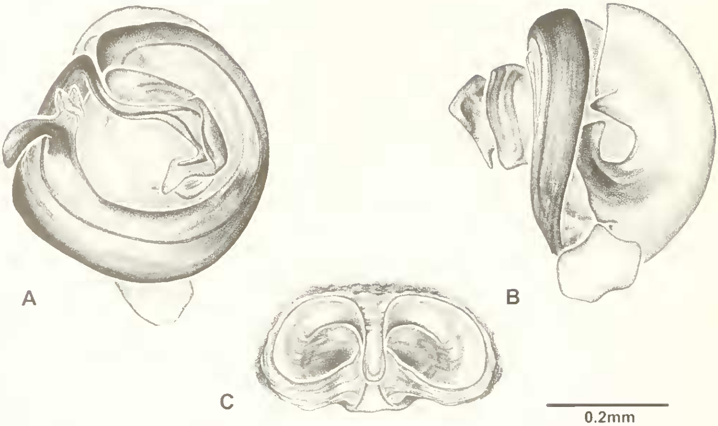

FIGURE 102. Genitalia of *Pokennips dentipes* (Simon), from Buffels Bay. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

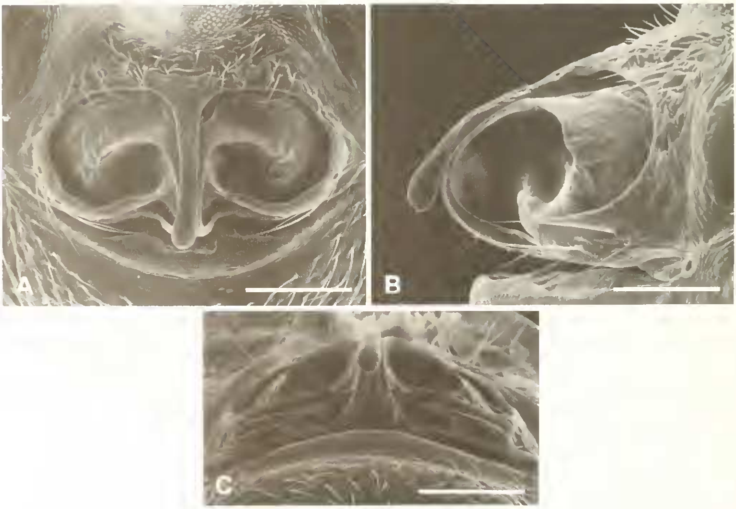

FIGURE 103. Epigynum of *Pokennips dentipes* (Simon), ♀ from Buffels Bay. A. Ventral. B. Lateral. C. Posterior. Scale bars for A, C = 150 μm; B = 100 μm.

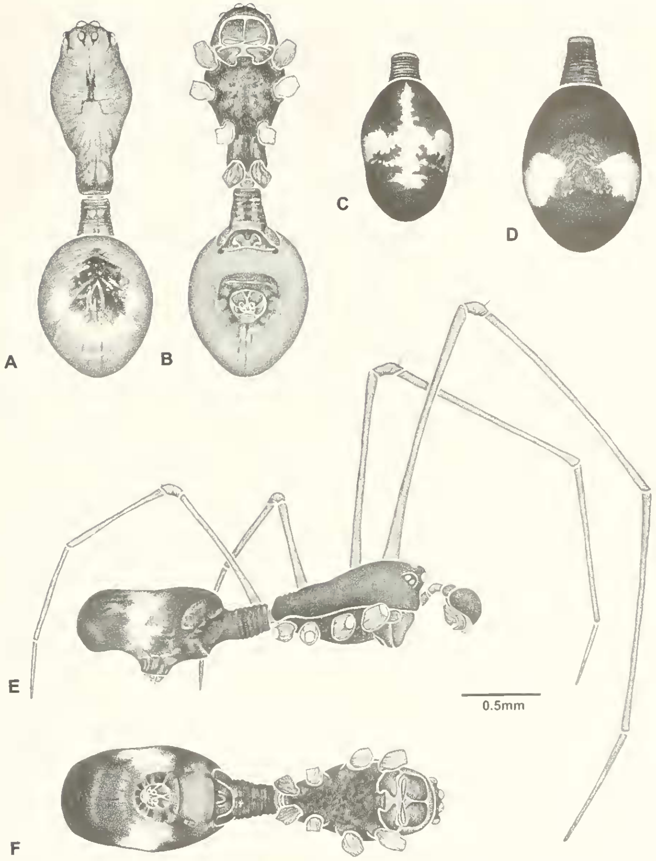

FIGURE 104. *Scharffia* spp. A, B. *S. holmi* Griswold, paratype ♀. C–F. *S. chinja* Griswold. C, D. ♀♀ from Amani. E. ♂ from Uzungwa. F. ♀ from Uzungwa. A, C, D. Dorsal. B, F. Ventral. E. Lateral. Illustrations by JS.

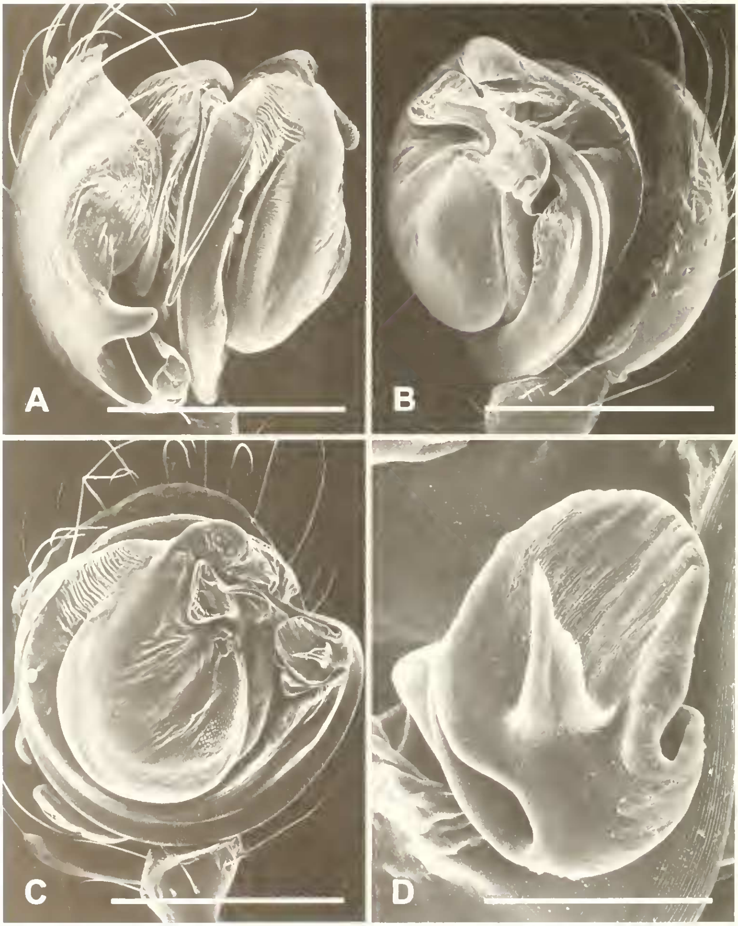

FIGURE 105. *Scharffia chinja* Griswold, right pedipalpus of ♂ from Mazumbai. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 50 μm.

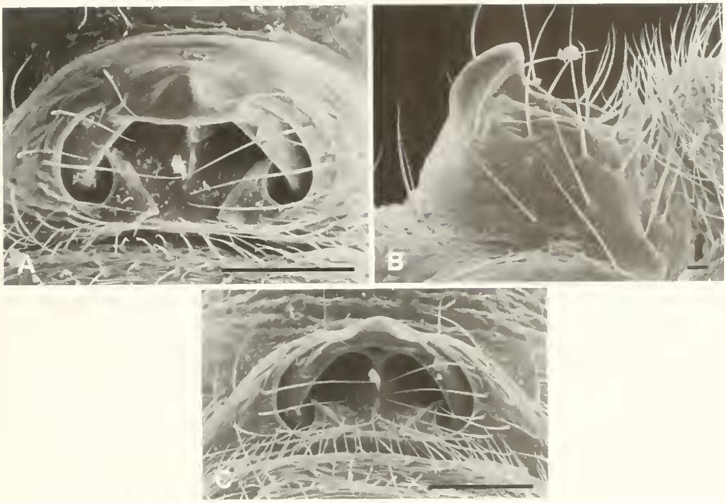

FIGURE 106. *Scharffia nyasa* Griswold, epigynum of ♀ from Mt. Mlanje. A. Ventral. B. Lateral. C. Posterior. Scale bars for A, C = 100 μm; B = 20 μm.

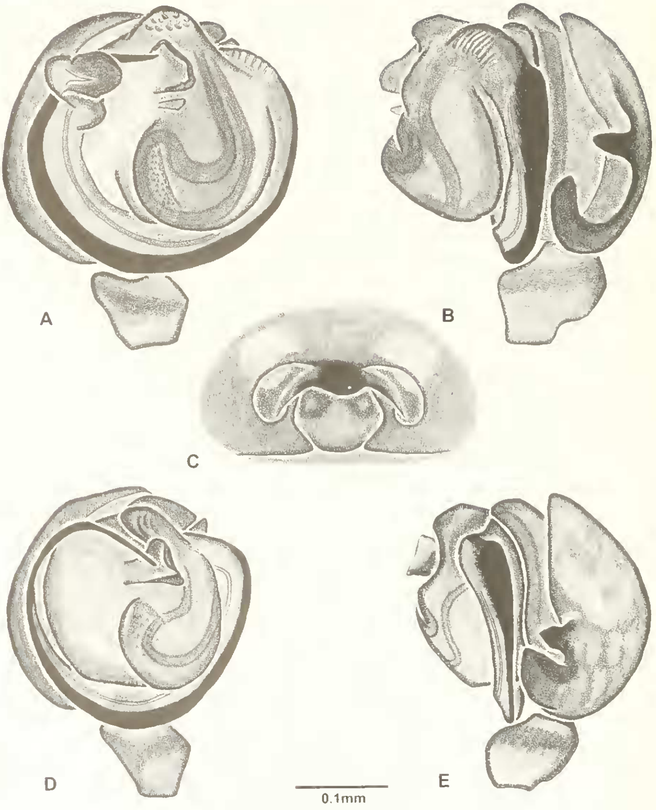

FIGURE 107. Genitalia of *Scharffia* spp. A, B. Left pedipalpus of holotype ♂ of *S. chinja* Griswold. C. Epigynum of *S. chinja* Griswold ♀ from Uzungwa. D, E. Left pedipalpus of holotype ♂ of *S. rossi* Griswold. A, C, D. Ventral. B, E. Retrolateral. Illustrations by CG.

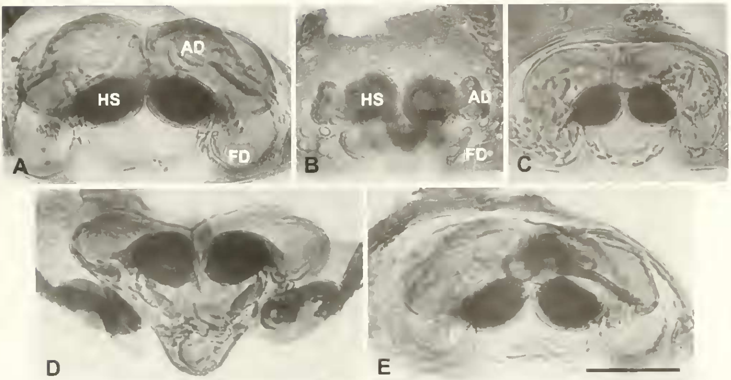

FIGURE 108. Cleared vulvae of *Scharffia* spp. A, D, E. *S. chinja* Griswold, ♀ from Kazimzumbwe. B. *S. holmi* Griswold, paratype. C. *S. nyasa* Griswold, ♀ from Mt. Mlanje. A–C. Dorsal. D. Posterior. E. Anterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

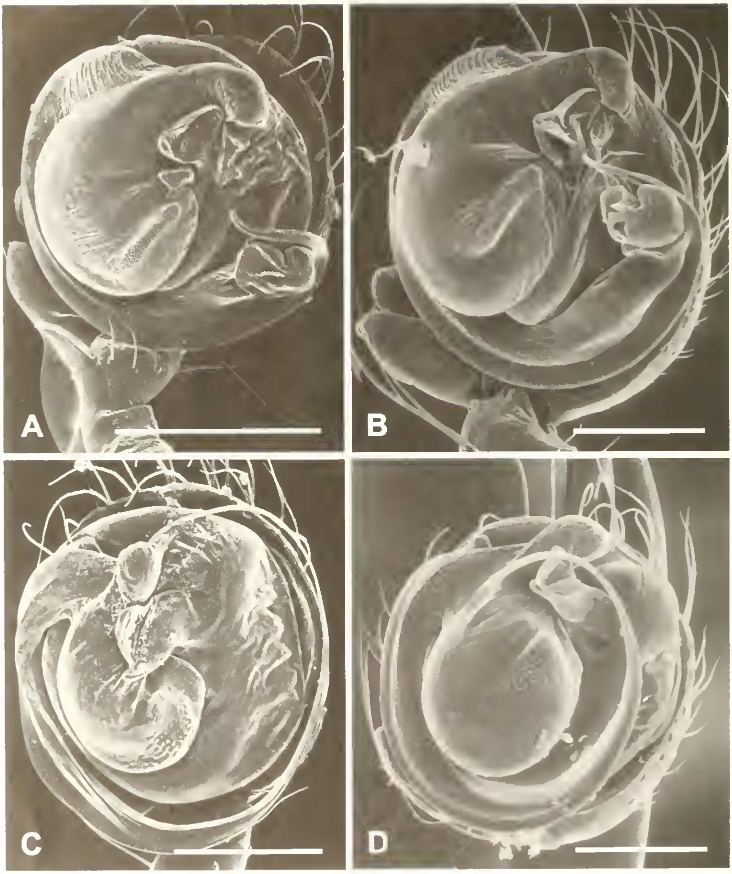

FIGURE 109. Right ♂ pedipalpi of *Scharffia* spp, ventral view. A. *S. chinja* Griswold, from Mt. Rungwe. B. *S. nyasa* Griswold, from Mt. Mlanje. C. *S. holmi* Griswold, holotype. D. *S. rossi* Griswold, holotype. Scale bars for A = 200 µm, B–D = 100 µm.

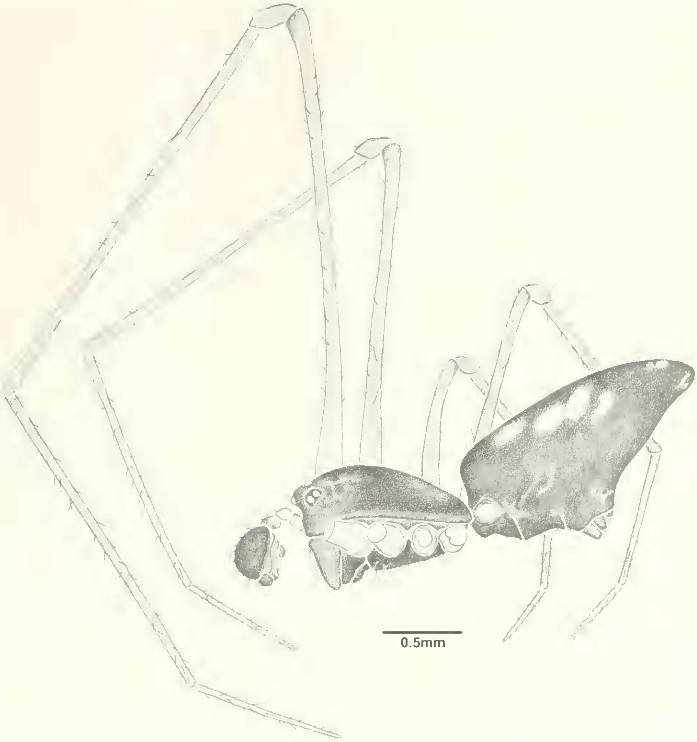

FIGURE 110. *Ubacisi capensis* (Griswold), paratype ♂, lateral. Illustration by JS.

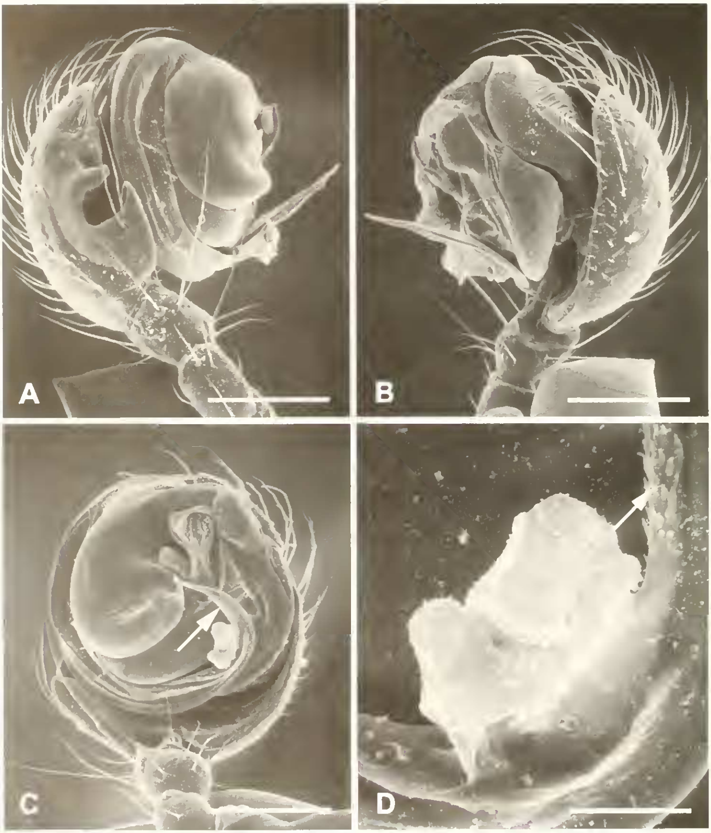

FIGURE 111. *Ubacisi capensis* (Griswold), right pedipalpus of ♂ from Newland's Ravine. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Arrows to denticles on embolus. Scale bars for A–C = 150 μm, D = 25 μm.

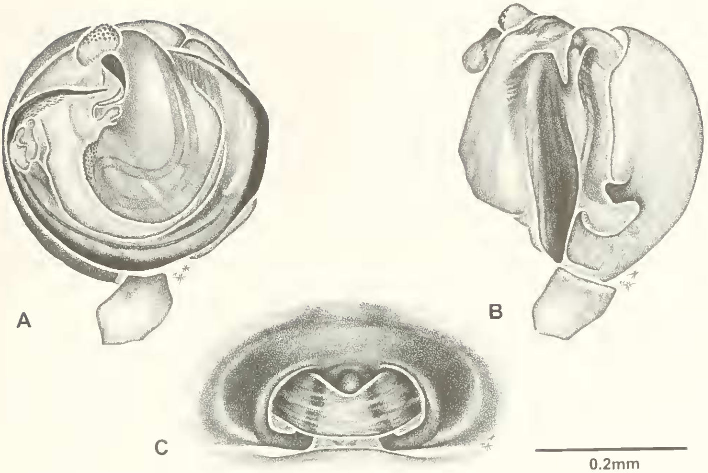

FIGURE 112. Genitalia of *Ubacisi capensis* (Griswold), paratypes of *Isicabu capensis*. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

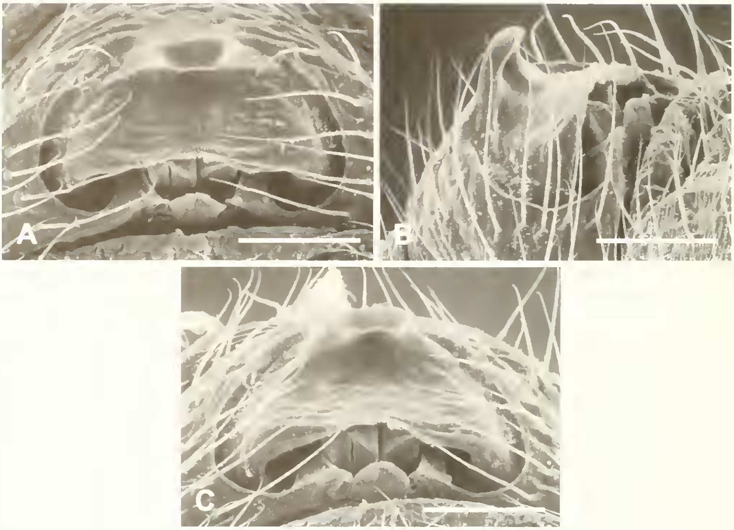

FIGURE 113. Epigynum of *Ubacisi capensis* (Griswold), ♀ from Newland's Ravine. A. Ventral. B. Lateral. C. Posterior. Scale bars = 75 µm.

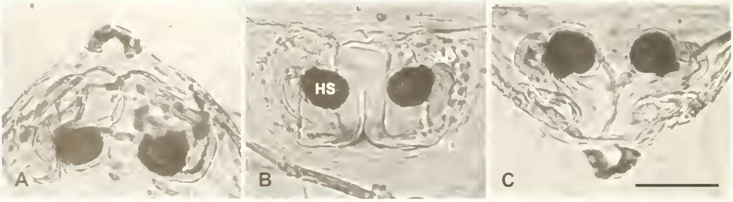

FIGURE 114. Cleared vulva of *Ubacisi capensis* (Griswold), ♀ from Fernwood Gulley. A. Anterior. B. Dorsal. C. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

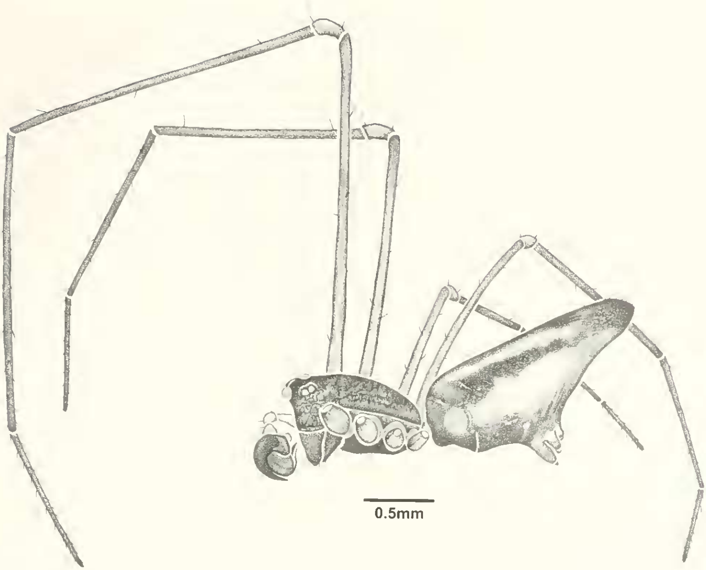

FIGURE 115. *Ulwembua antsiranana* Griswold, holotype ♂, lateral. Illustration by JS.

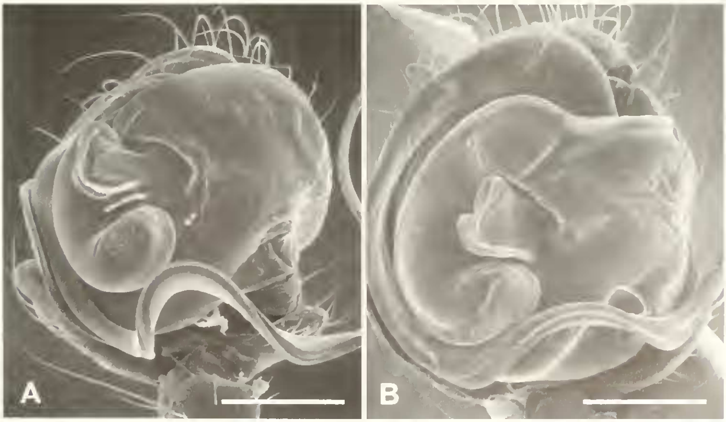

FIGURE 116. Right ♂ pedipalpi of *Ulwembua* spp., ventral. A. *U. antsiranana* Griswold, from Montagne d'Ambre. B. *U. ranomafana* Griswold, holotype. Scale bars for A, B = 100 µm.

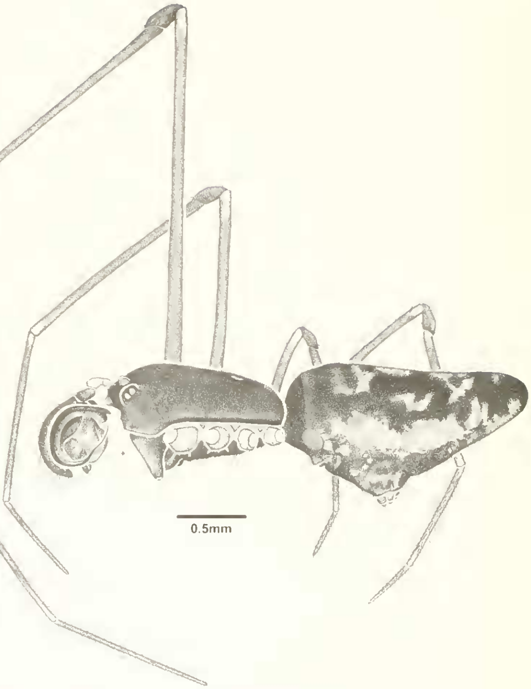

FIGURE 117. *Ulwembua denticulata* Griswold, ♂ from Misty Mountain, lateral. Illustration by JS.

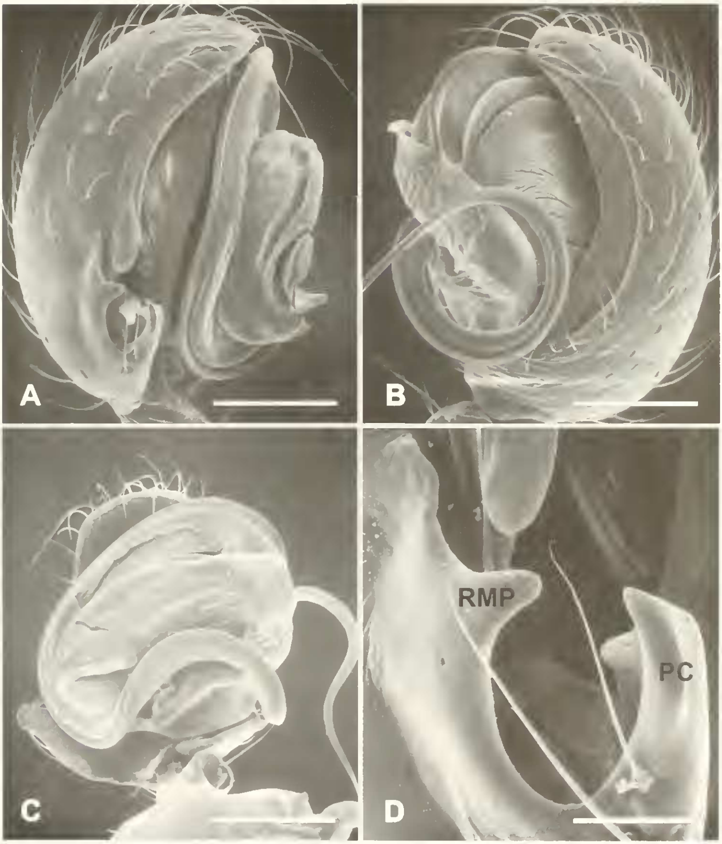

FIGURE 118. *Ulwembua denticulata* Griswold, right pedipalpus of ♂ from Misty Mountain. A. Retrolateral. B. Prolateral. C. Ventral. D. Detail of paracymbium and retromedian cymbial process. PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A, B = 150 µm; C = 200 µm; D = 43 µm.

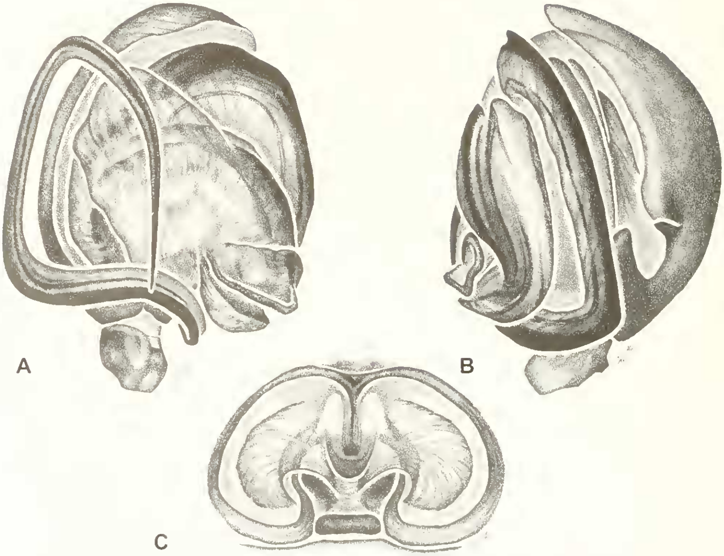

FIGURE 119. Genitalia of *Ulwembua denticulata* Griswold, from Misty Mountain. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

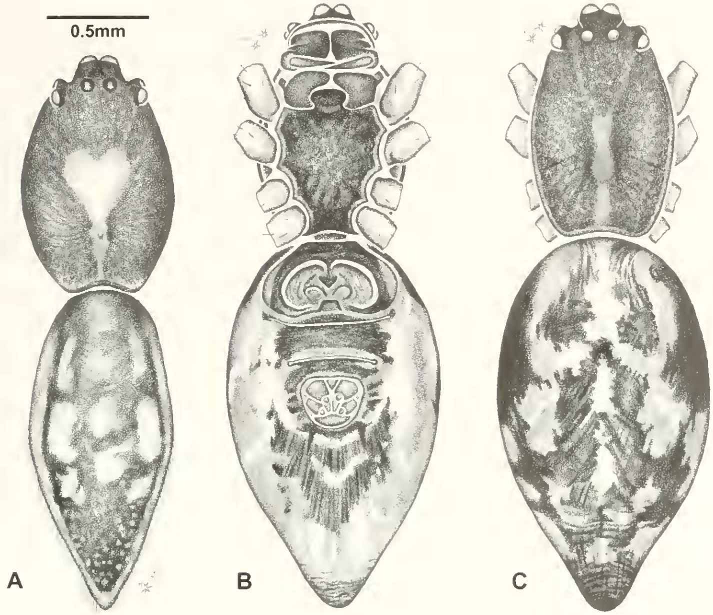

FIGURE 120. *Ulwembua* spp. A. *U. pulchra* Griswold, paratype ♂. B, C. *U. denticulata* Griswold, ♀ from Misty Mountain. A, C. Dorsal. B. Ventral. Illustrations by JS.

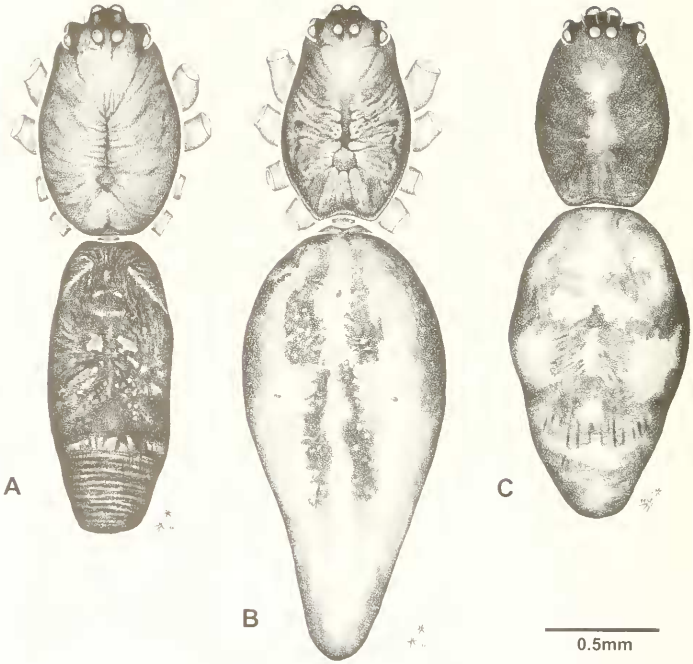

FIGURE 121. *Ulwembua* spp, dorsal views. A. *U. nigra*, new species, holotype ♂. B. *U. nigra*, new species, paratype ♀. C. *U. outeniqua* Griswold, ♀ from Harkerville State Forest. Illustrations by JS.

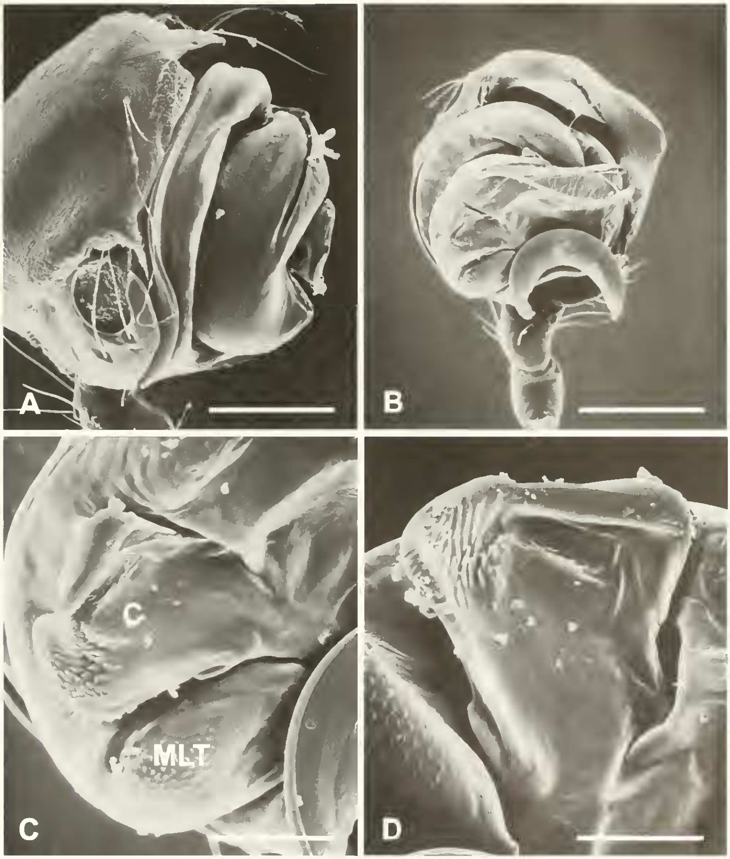

FIGURE 122. *Ulwembua nigra*, new species, right pedipalpus of ♂ from Marojejy. A. Retrolateral. B. Ventral C. Conductor and MLT, ventral. D. Detail of conductor. C = conductor, MLT = median lobe of tegulum. Scale bars for A = 100 μm, B = 150 μm, C = 43 μm, D = 30 μm.

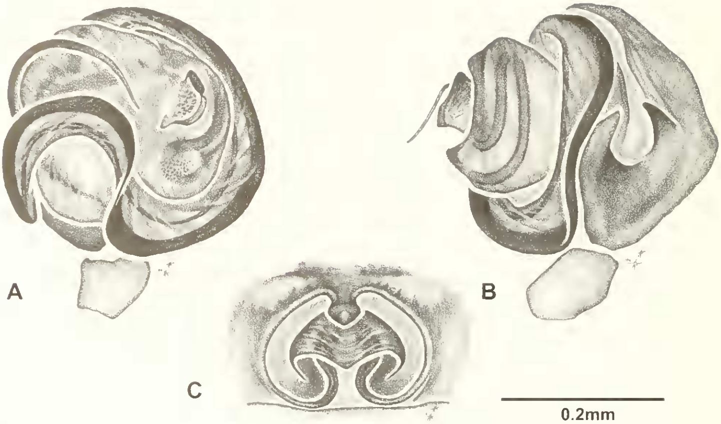

FIGURE 123. Genitalia of *Ulwembua nigra*, new species. A, B. Holotype ♂, left pedipalpus. C. Paratype ♀, epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

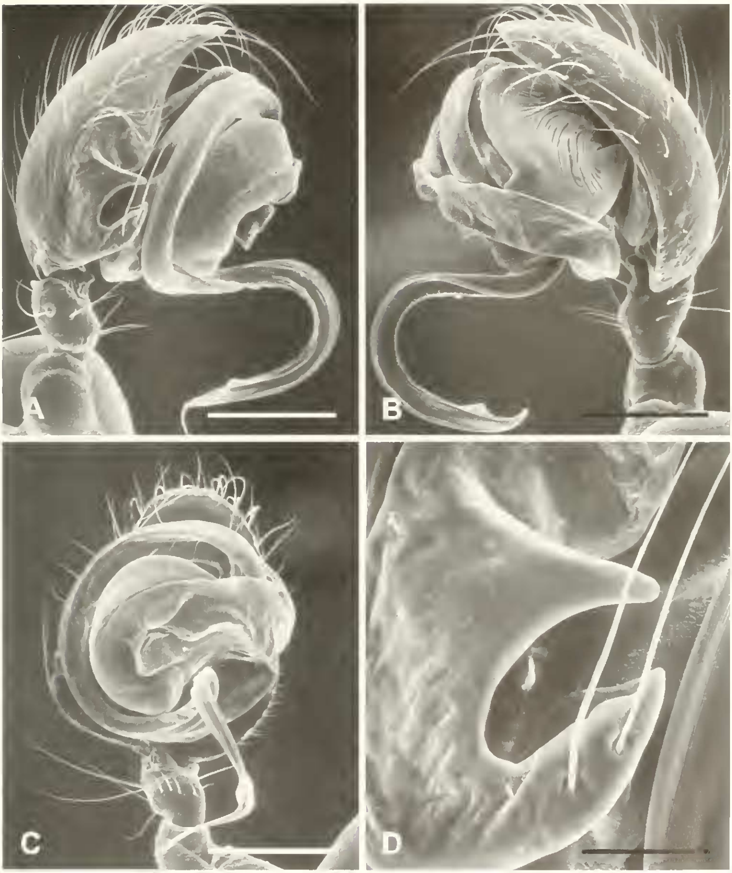

FIGURE 124. *Ulwembua outeniqua* Griswold, right pedipalpus of ♂ from Harkerville State Forest. A. Retrolateral. B. Prolateral. C. Ventral. D. Detail of paracymbium and retromedian cymbial process. Scale bars for A, B = 150 μm; C = 175 μm; D = 43 μm.

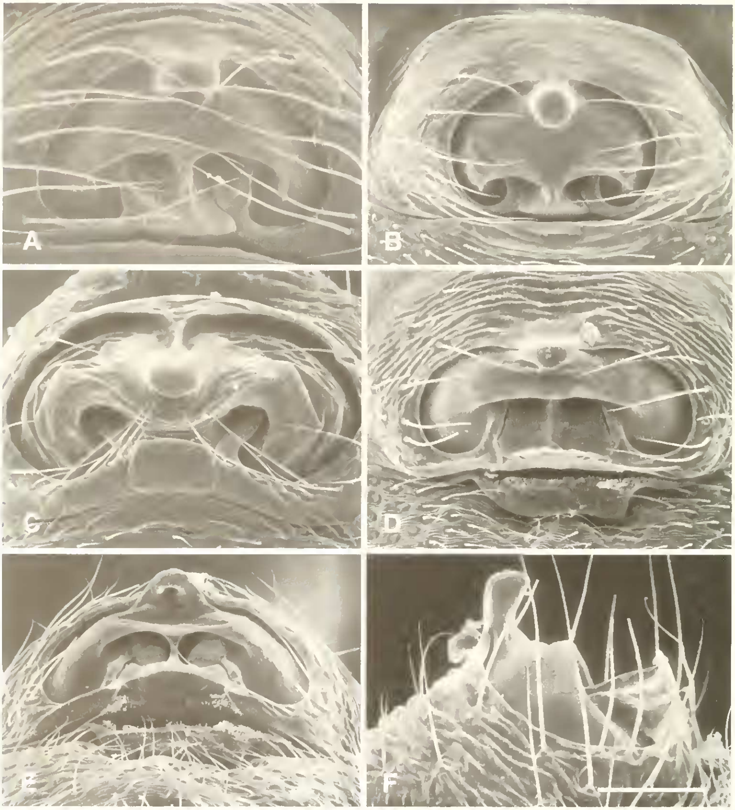

FIGURE 125. Epigyna of *Ulwembua* spp. A. *U. antsiranana* Griswold, ♀ from Montagne d'Ambre. B. *U. ranomafana* Griswold, paratype. C. *U. usambara*, new species, ♀ from Mazumbai. D–F. *U. outemqua* Griswold, ♀ from Harkerville State Forest. A–D. Ventral. E. Posterior. F. Lateral. Scale bars for A, F = 60 μm; B–E = 100 μm.

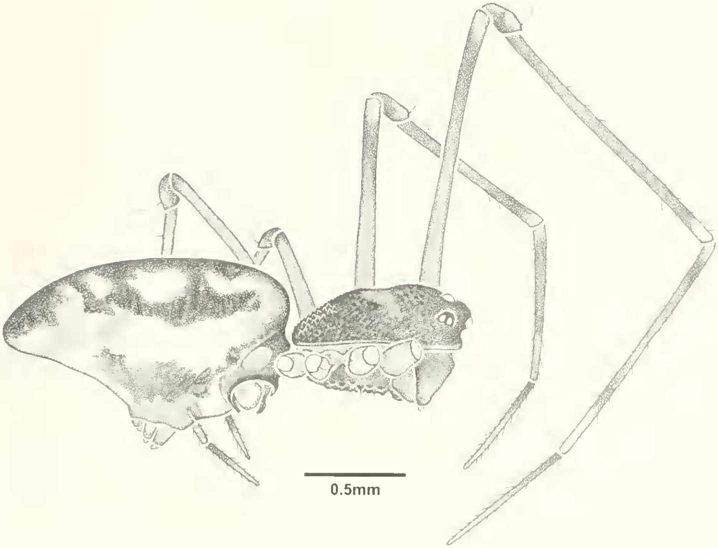

FIGURE 126. *Ulwembua pulchra* Griswold, paratype ♀, lateral. Illustration by JS.

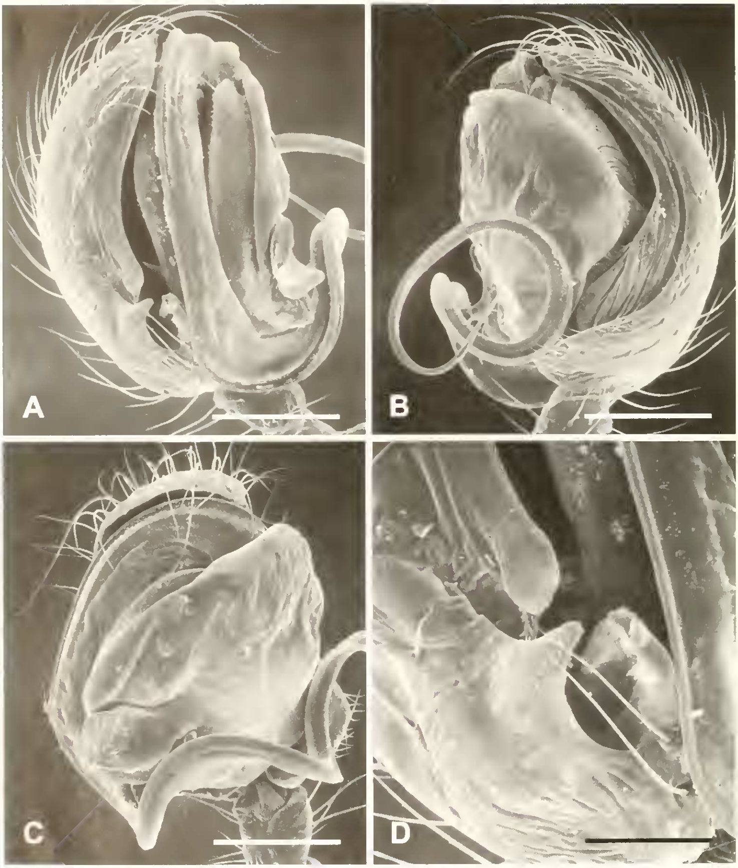

FIGURE 127. *Ulwembua pulchra* Griswold, right ♂ pedipalpus of paratype. A. Retrolateral. B. Prolateral. C. Ventral. D. Detail of paracymbium and retromedian cymbial process. Scale bars for A–C = 150 µm, D = 60 µm.

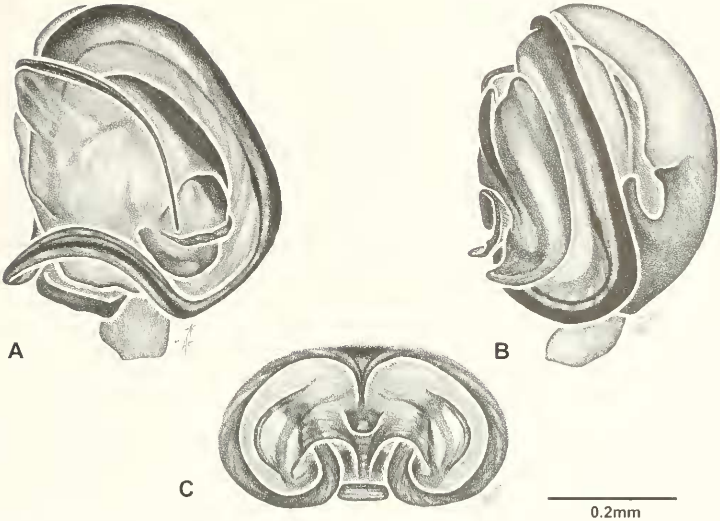

FIGURE 128. Genitalia of *Ulwembua pulchra* Griswold, paratypes. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

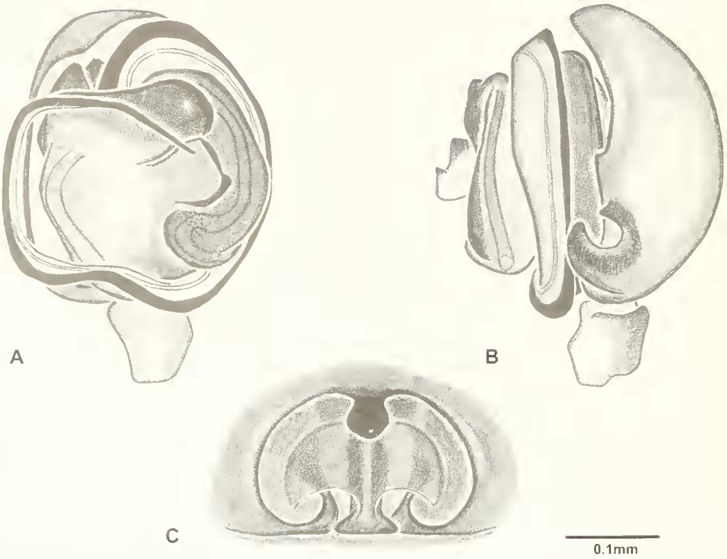

Figure 129. Genitalia of *Ulwembua ranomafana* Griswold. A, B. Holotype ♂, left pedipalpus. C. Paratype ♀, epigynum. A, C. Ventral. B. Retrolateral. Illustrations by CG.

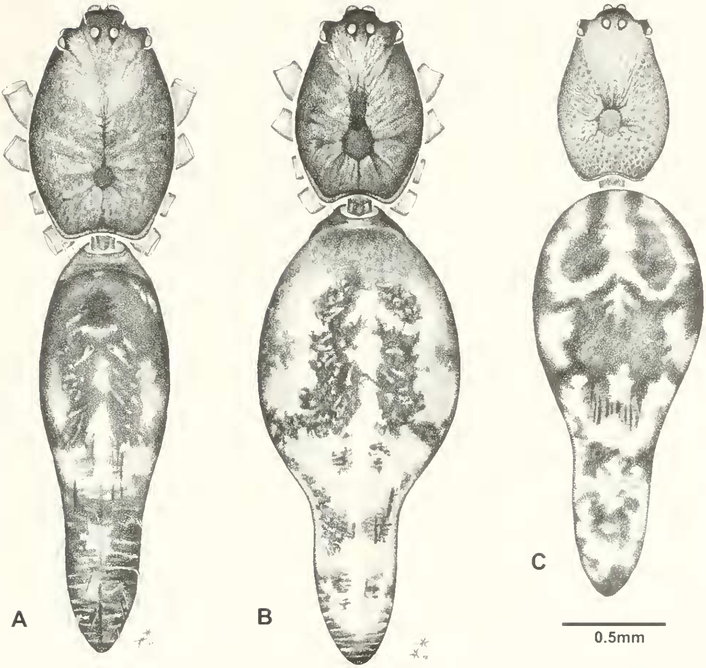

FIGURE 130. *Ulwembua usambara*, new species, all dorsal. A. Holotype ♂. B. Paratype ♀. C. ♀ from Uluguru Mts. Illustrations by JS.

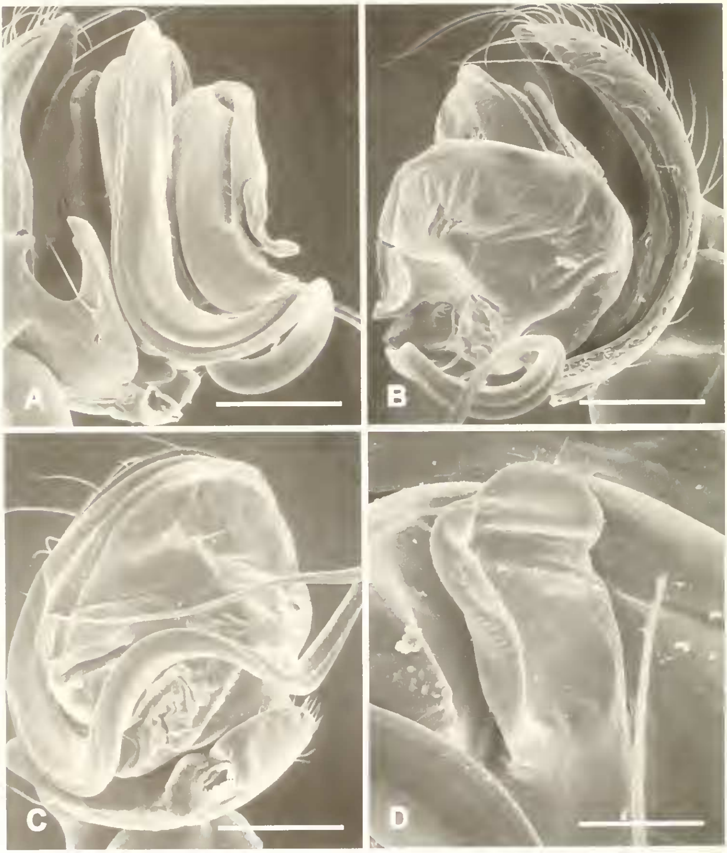

FIGURE 131. *Ulwembua usambara*, new species, right pedipalpus of ♂ from Mazumbai. A. Retrolateral. B. Prolateral. C. Ventral. D. Detail of conductor. Scale bars for A = 125 µm; B, C = 136 µm; D = 43 µm.

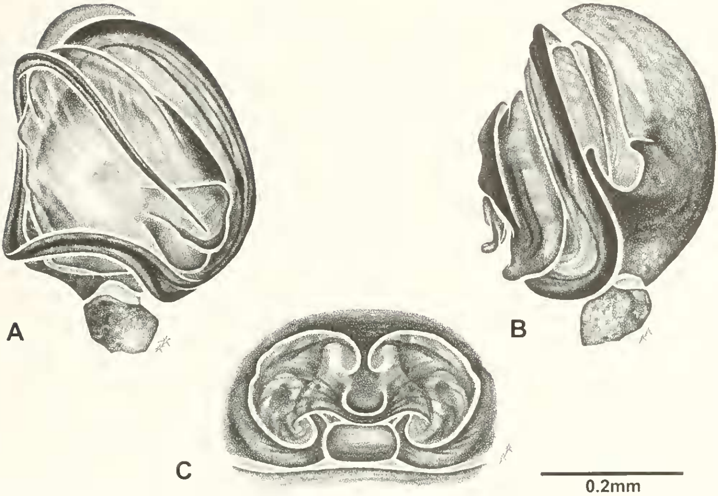

FIGURE 132. Genitalia of *Ulwembua usambara*, new species. A, B. Holotype ♂, left pedipalpus. C. Paratype ♀, epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

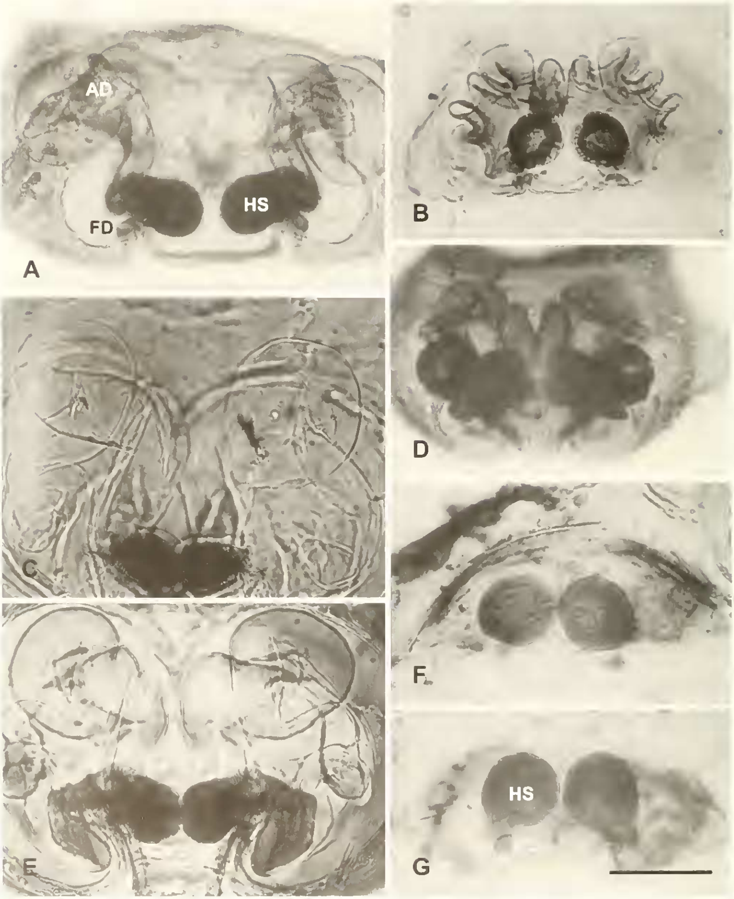

FIGURE 133. Cleared vulvae of Cyatholipidae. A–E. *Ulwembua* spp. A. *U. outeniqua* Griswold, ♀ from Nature's Valley. B. *U. antsiranana* Griswold, Montagne d'Ambre. C. *U. denticulata* Griswold, ♀ from Misty Mountain. D. *U. nigra*, new species, ♀ from Marojejy. E. *U. usambara*, new species, ♀ from Uluguru Mts. F, G. *Vazaha toamasina* Griswold, paratype. A–E, G. Dorsal. F. Anterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

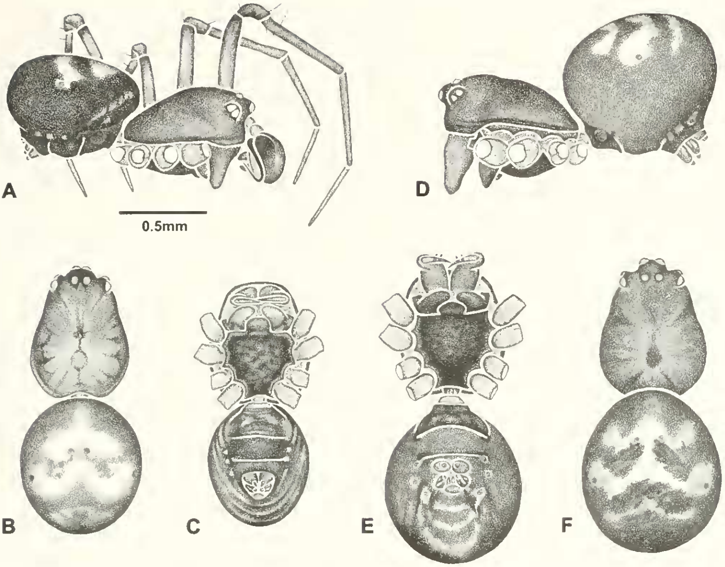

FIGURE 134. *Umwani* spp. A–C. *U. artigamos*, new species, holotype ♂. D–F. *U. anymphos*, new species, holotype ♂. A, D. Lateral. B, F. Dorsal. C, E. Ventral. Illustrations by JS

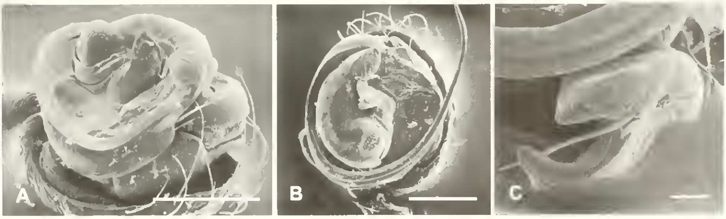

FIGURE 135. *Umwani anymphos*, new species, right pedipalpus of holotype ♂. A. Prolateral. B. Ventral. C. Retrolateral detail of paracymbium and retromedian cymbial process. Scale bars for A, B = 100 μm; C = 20 μm.

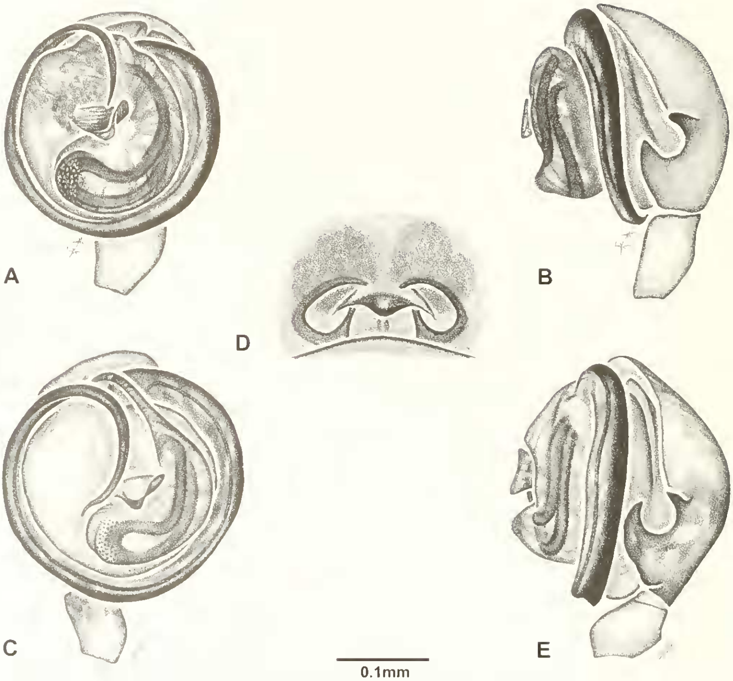

FIGURE 136. Genitalia of *Umwani* spp. A, B. *U. anymphos*, new species, holotype ♂, left pedipalpus. C, E. *U. artigamos*, new species, holotype ♂, left pedipalpus. D. *U. artigamos*, new species, paratype ♀, epigynum. A, C, D. Ventral. B, E. Retrolateral. Illustrations A–C and E by JS, D by CG.

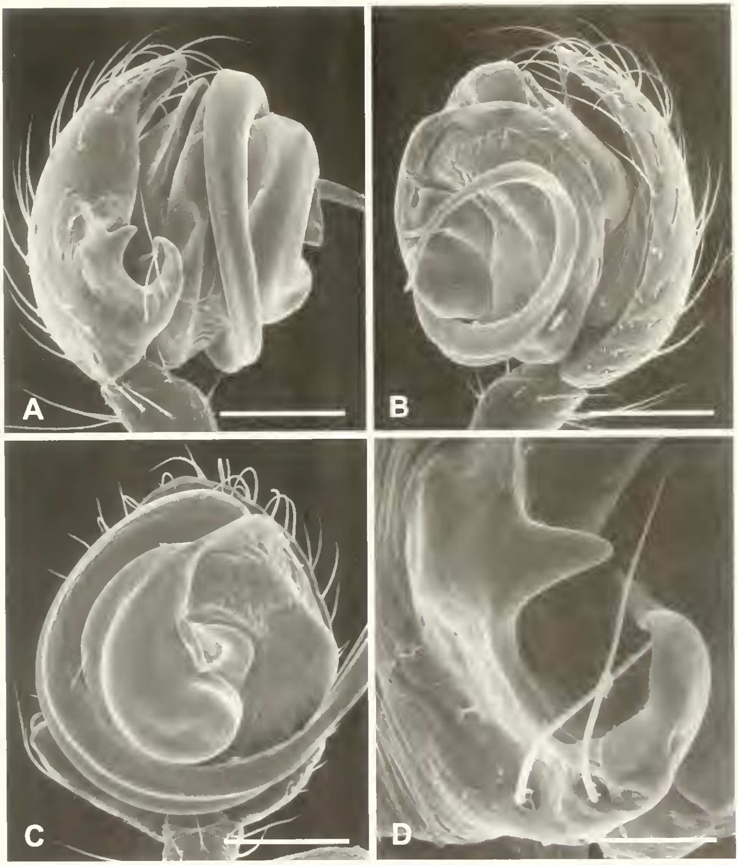

FIGURE 137. *Umwani artigamos*, new species, right pedipalpus of holotype ♂. A. Retrolateral. B. Prolateral. C. Ventral. D. Detail of paracymbium and retromedian cymbial process. Scale bars for A–C = 100 μm, D = 30 μm.

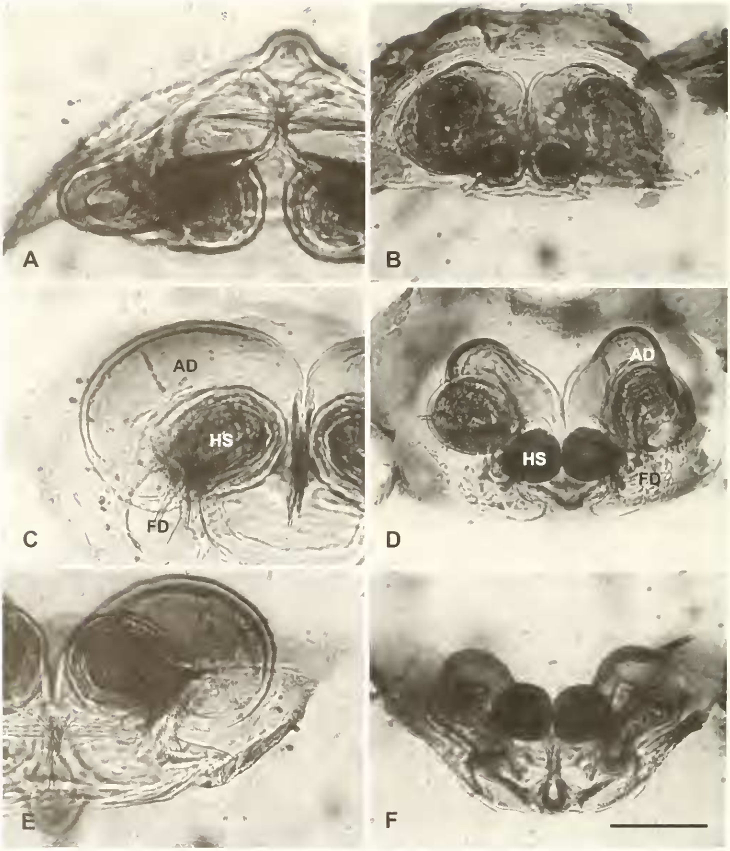

FIGURE 138. Cleared vulvae of Cyatholipidae. A, C, E. *Uvik vulgaris*, new species, ♀ from Bujuku Valley. B, D, F. *Umwani artigamos*, new species, paratype ♀. A, B. Anterior. C. Ventral. D. Dorsal. E, F. Posterior. AD = vulval afferent duct, FD = fertilization duct, HS = spermathecal head. Scale bar = 0.1 mm.

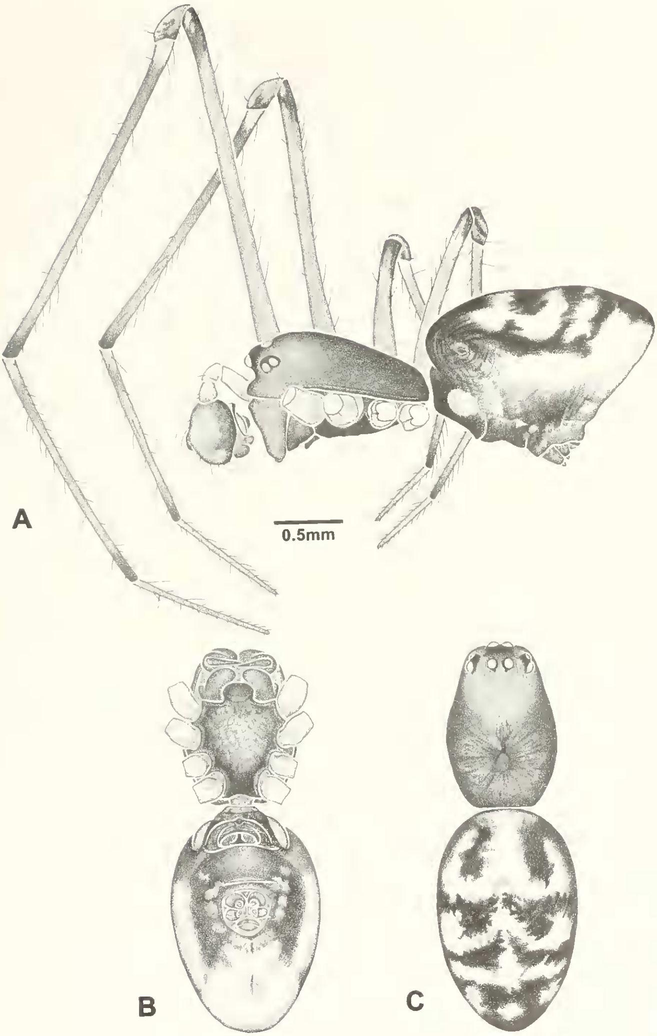

FIGURE 139. *Uvik vulgaris*, new species, specimens from Volcan Karisimbi. A. ♂, lateral. B. ♀, ventral. C. ♀, dorsal. Illustrations by JS.

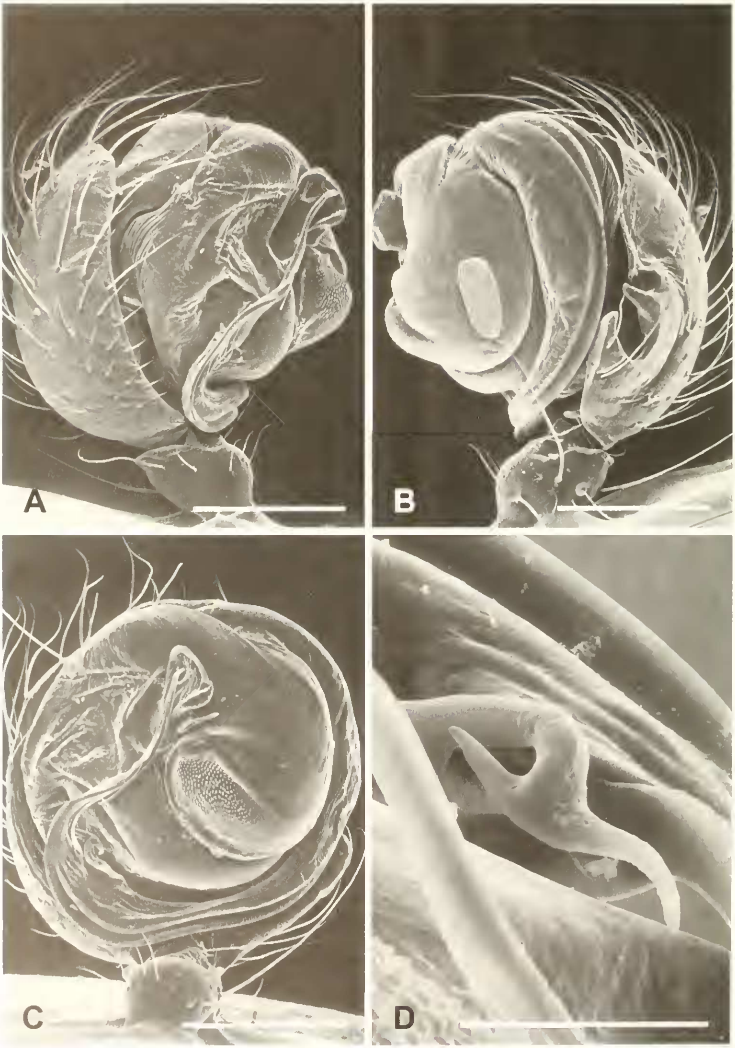

FIGURE 140. *Uvik vulgaris*, new species, right ♂ pedipalpus. A–C. ♂ from Volcan Nyiragongo. D. ♂ from Volcan Karisimbi. A. Retrolateral. B. Prolateral (oval object is Lepidoptera scale adhering to tegulum). C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 40 μm.

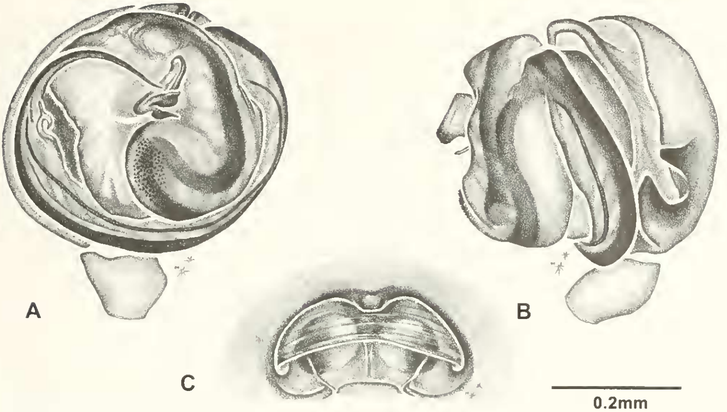

FIGURE 141. Genitalia of *Uvik vulgaris*, new species, paratypes from Volcan Nyiragongo. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

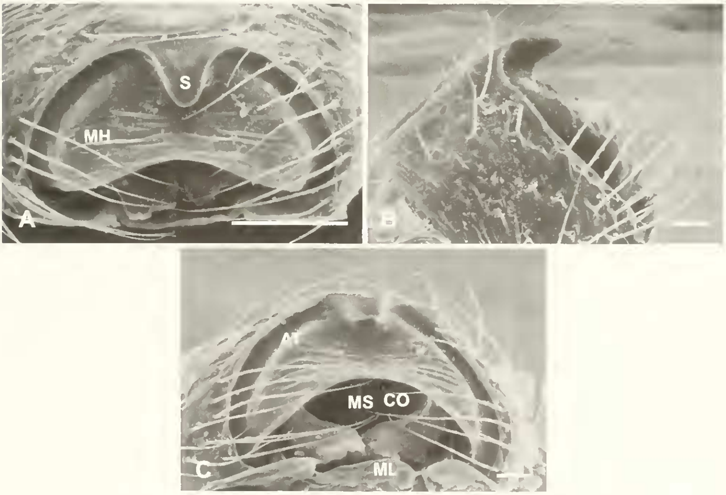

FIGURE 142. *Uvik vulgaris*, new species, epigynum of ♀ from Kanzuiri, Ruwenzori. A. Ventral. B. Lateral. C. Posterior. AT = epigynal atrium, CO = copulatory opening, MH = epigynal median hood, ML = epigynal median lobe, MS = epigynal median septum, S = epigynal scape. Scale bars for A = 100 μm; B, C = 40 μm.

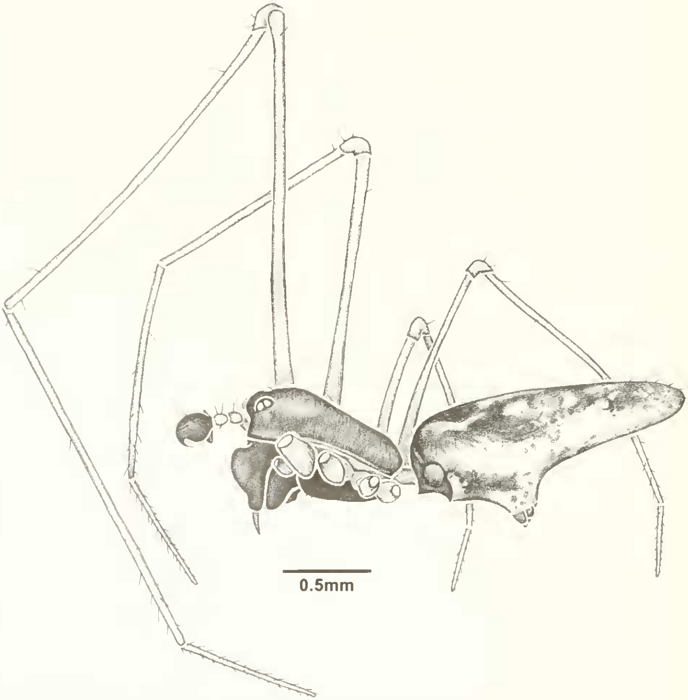

FIGURE 143. *Vazaha toamasina* Griswold, holotype ♂, lateral view. Illustrations by JS.

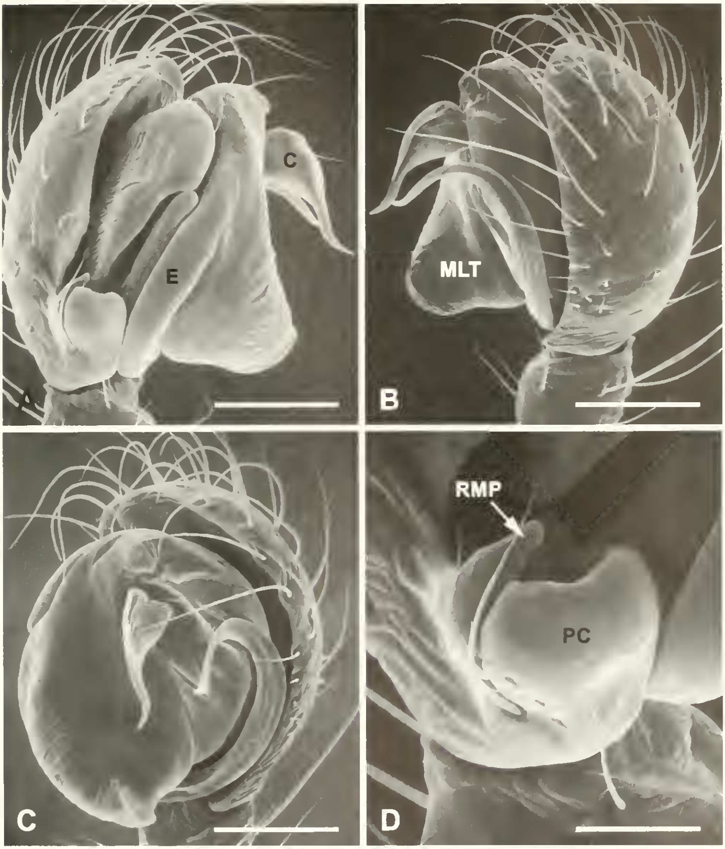

FIGURE 144. *Vazaha toamasina* Griswold, right pedipalpus of holotype ♂. A. Retrolateral. B. Prolateral. C. Ventral. D. Cymbial base, retrolateral view, showing detail of paracymbium and retromedian cymbial process. C = conductor, E = embolus, MLT = median lobe of tegulum, PC = paracymbium, RMP = retromedian cymbial process. Scale bars for A–C = 75 μm, D = 25 μm.

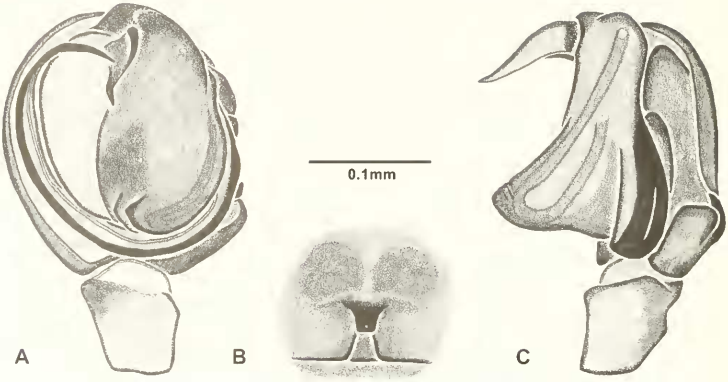

FIGURE 145. Genitalia of *Vazaha toamasina* Griswold. A, C. Left ♂ palpus, holotype. B. Epigynum, paratype. A, B. Ventral. C. Retrolateral. Illustrations by CG.

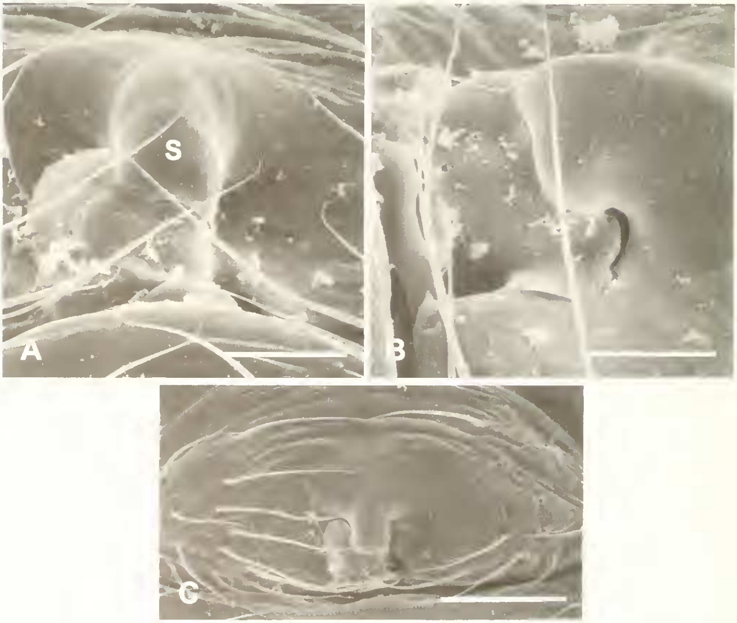

FIGURE 146. *Vazaha toamasina* Griswold, epigynum of paratype ♀. A. Posterior. B. Lateral. C. Ventral. S = scape. Scale bars for A = 25 µm, B = 20 µm, C = 75 µm.

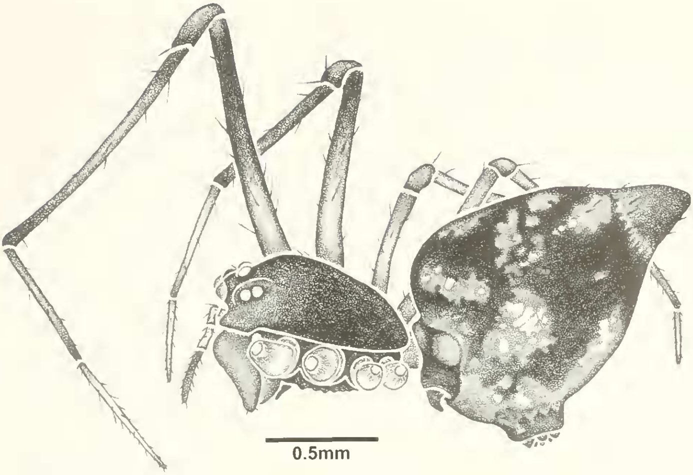

FIGURE 147. *Wanzia fako* Griswold, ♀ from Mann's Spring, lateral. Illustration by JS.

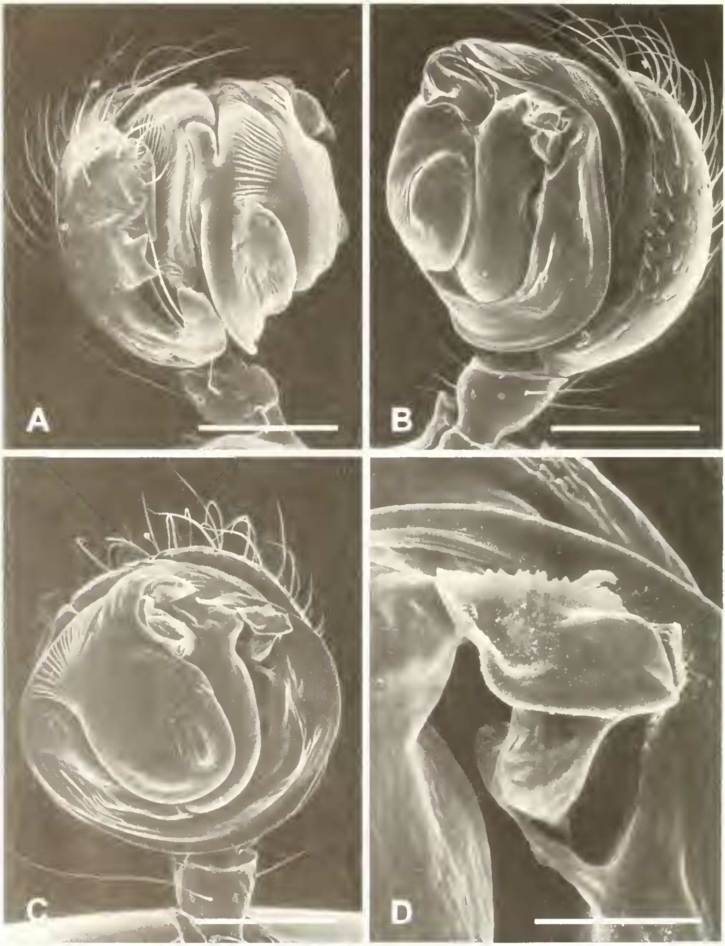

FIGURE 148. *Wanzia fako* Griswold, right pedipalpus of ♂ from Mount Oku. A. Retrolateral. B. Prolateral. C. Ventral. D. Parembolic process. Scale bars for A–C = 200 μm, D = 50 μm.

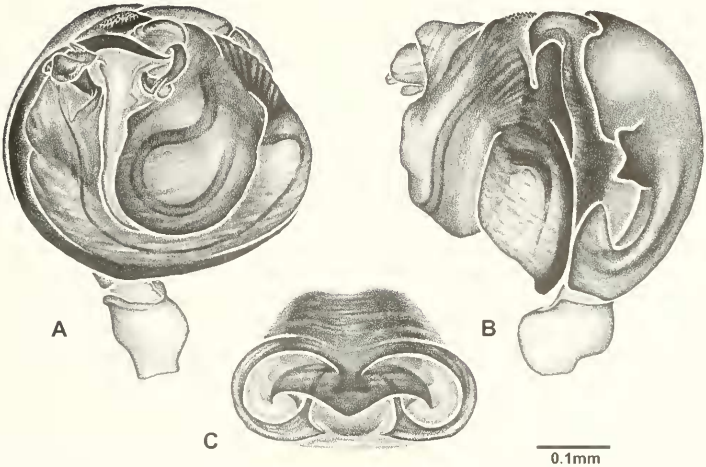

FIGURE 149. *Wanzia fako* Griswold, genitalia of specimens from Buea. A, B. Left ♂ pedipalpus. C. Epigynum. A, C. Ventral. B. Retrolateral. Illustrations by JS.

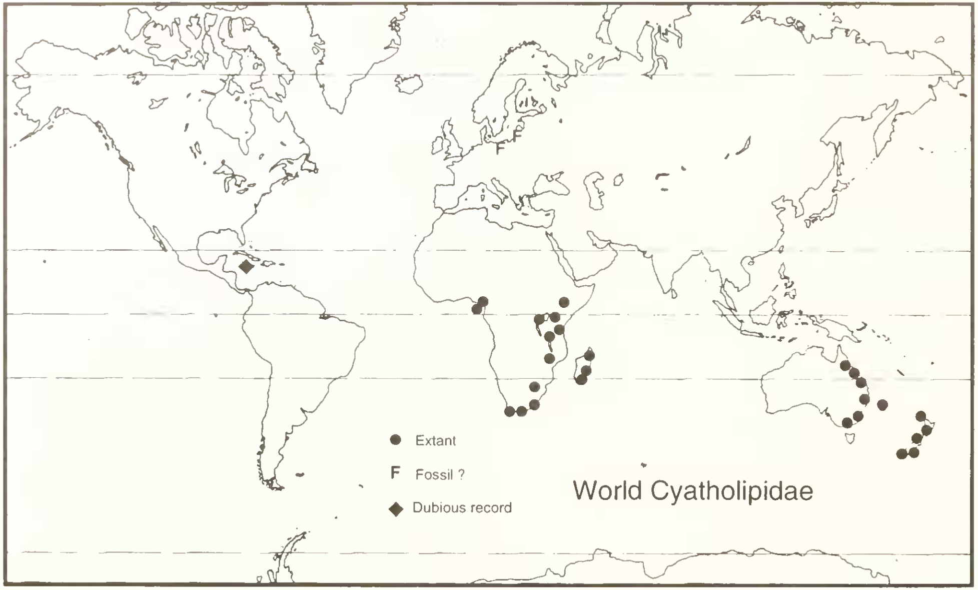

FIGURE 150. World distribution of Cyatholipidae. Closed circles = confirmed modern records. F = possible fossils. Closed diamond = dubious record of *Pokennips dentipes* (Simon) from Jamaica.

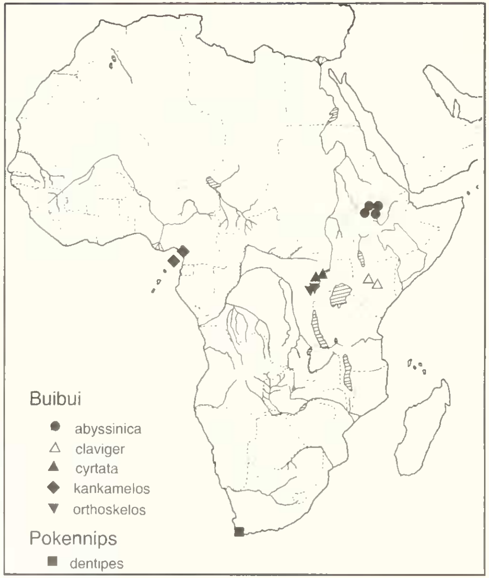

FIGURE 151. Africa, showing distribution of *Buibui* and *Pokennips*.

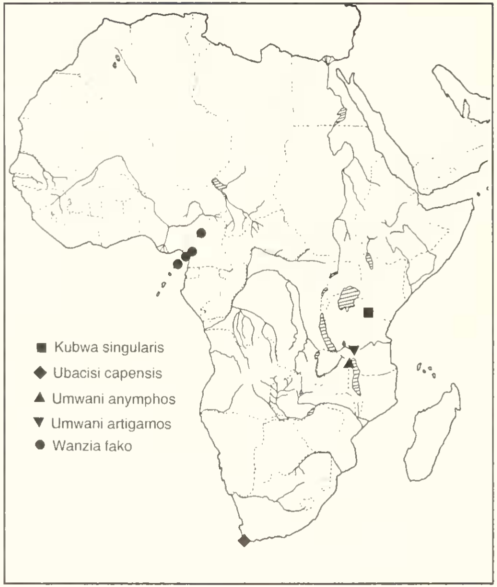

FIGURE 152. Africa, showing distribution of *Kubwa*, *Ubacisi*, *Umwani* and *Wanzia*.

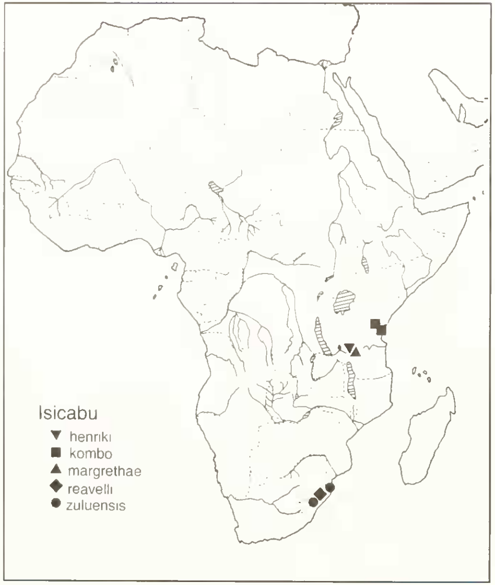

FIGURE 153. Africa, showing distribution of *Isicabu.*

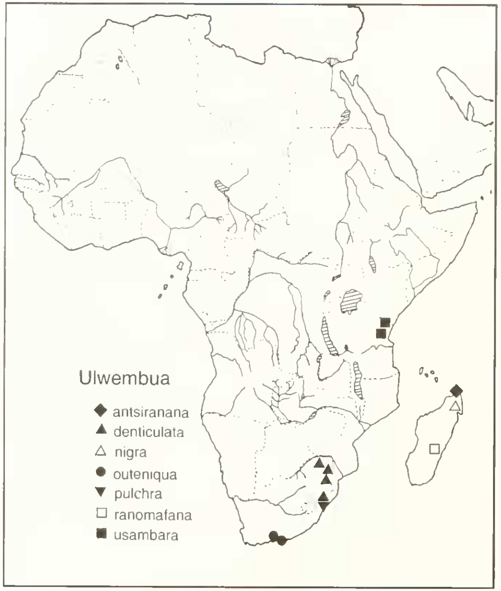

FIGURE 154. Africa, showing distribution of *Ulwembua.*

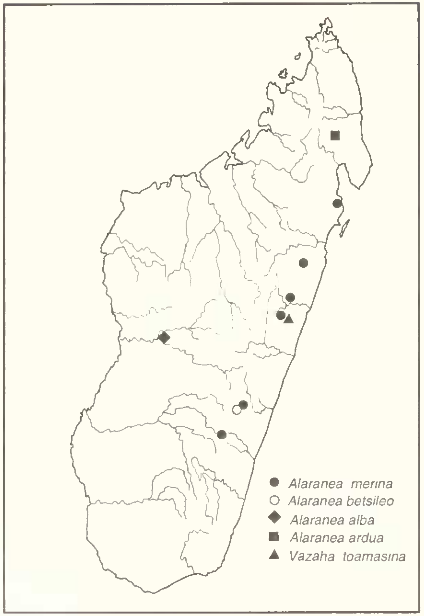

FIGURE 155. Madagascar, showing distribution of *Alaranea* and *Vazaha*.

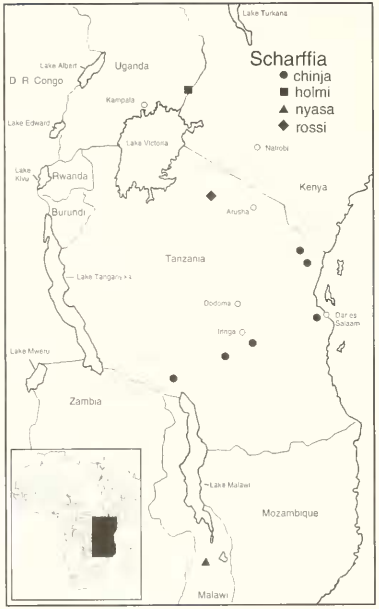

FIGURE 156. Eastern Africa, showing distribution of *Scharffia*.

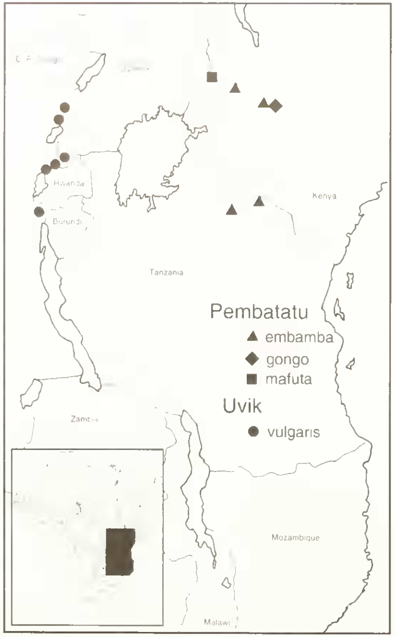

FIGURE 157. Eastern Africa, showing distribution of *Pembatatu* and *Uvik*.

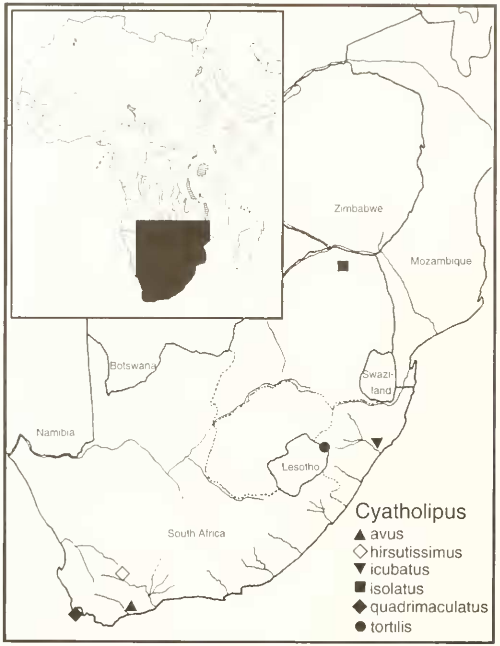

FIGURE 158. Southern Africa, showing distribution of *Cyatholipus*.

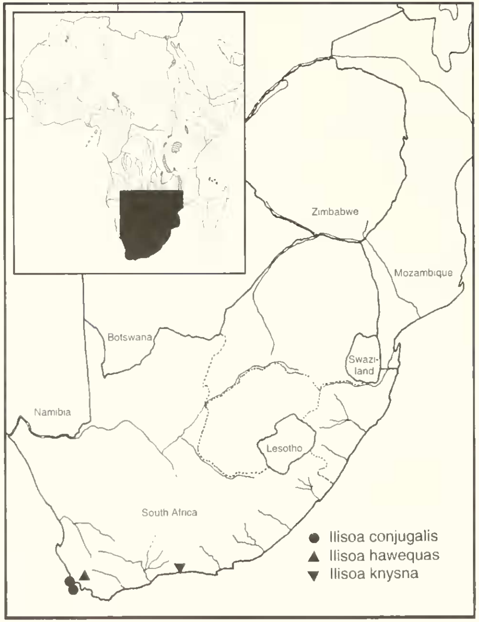

FIGURE 159. Southern Africa, showing distribution of *Ilisoa*.

Appendix

Character by taxon matrix. Rows represent characters. The first state listed is coded as "0", the second as "1", etc., "?" = unknown, "-" = non-applicable. Columns represent taxa; abbreviations are vertical. The final five columns give the number of steps, the consistency index, the retention index, weight calculated by successive weighting in Hennig86, and fit on the "fittest" tree determined by Pee Wee.

Taxon abbreviations: OUT = Synotaxidae, LH1 = ***Lordhowea nesiota***, new species ♂♀, Tlm = ***Tekellatus lamingtoniensis*** Wunderlich, 1978 ♂, Mt1 = ***Matilda australia*** Forster, 1988 ♂♀, Td1 = ***Toddiana daviesae*** Forster, 1988 ♂♀, Te1 = ***Teemenaarus silvestris*** Davies, 1978 ♂♀, Hap = ***Hanea paturau*** Forster, 1988 ♂, Tk1 = ***Tekella absidata*** Urquhart, 1894 ♂♀, Tl1 = ***Tekelloides australis*** Forster, 1988 ♂♀, KvR = ***Buibui orthoskelos***, Kivu R, new species ♂♀, MKR = ***Buibui claviger***, Mt. Kenya R, new species ♂♀, RwR = ***Buibui cyrtata***, Ruwenzori R, new species ♂♀, Isc = ***Ubacisi capensis*** (Griswold 1987) ♂♀, CmT = ***Wanzia fako*** Griswold, 1998 ♂♀, AAT = ***Buibui abyssinica***, Ethiopia T, new species ♂♀, KvT = ***Uvik vulgaris***, new genus: Kivu T, new species ♂♀, MKT = ***Pembatatu gongo***, Mt Kenya T, new species ♂♀, Kil = ***Kubwa singularis***, New genus: Kilimanjaro T, new species ♂♀, NgT = ***Pembatatu embamba***, Ngo T, new species ♂♀, Isr = ***Isicabu reavelli*** Griswold, 1987 ♂♀, MwT = ***Isicabu henriki***, MwanihanaT, new species ♂♀, UsT = ***Isicabu kombo***, UsambaraT, new species ♂♀, Ulp = ***Ulwembua pulchra*** Griswold, 1987 ♂♀, Ulo = ***Ulwembua outeniqua*** Griswold, 1987 ♂♀, UsU = ***Ulwembua usambara*** new species ♂♀, MAA = ***Ulwembua antsiranana*** Griswold, 1997 ♂♀, Ra3 = ***Ulwembua ranomafana*** Griswold, 1997 ♂♀, Ils = ***Ilisoa knysna*** Griswold, 1987 ♂ and ***I. hawequas*** Griswold, 1987 ♀, BfB = ***Ilisoa conjugalis***, BuffelsBay, new species ♂♀, Cyd = ***Pokennips dentipes*** (Simon), 1894 ♂♀, MwR = ***Umwani artigamos*** RR MwanihanaR, new species ♂♀, Pe2 = ***Vazaha toamasina*** Griswold, 1997 ♂♀, MdA = ***Alaranea betsileo*** Griswold, 1997 ♂♀, MdC = ***Alaranea alba*** Griswold, 1997 ♂♀, MEP = ***Scharffia holmi*** Griswold, 1997 ♂♀, UsP = ***Scharffia chinja*** Griswold, 1997 ♂♀, MIP = ***Scharffia nyasa*** Griswold, 1997 ♂♀, Cya =***Cyatholipus quadrimaculatus*** Simon, 1894 ♂♀.

Character abbreviations: AD = vulval afferant duct, AL = apical lobe, anvl = anvil-shaped, abr = arborescent, C = conductor, EG = embolic groove, F = femur, Ha = Hanea type, hkd = hooked, HS = spermathecal head, MLT = tegular median lobe, Ma = Matilda type, Mt = metatarsus, PC = paracymbium, PEP = parembolic process, Pk = Pokennips type, RMP = cymbial retromedian process, scler = sclerotized, T = tibia, T-s = T-shaped, Te = Teemenaarus type, Td = Toddiana type, Tk = Tekella, Tl = Tekelloides, 1-2 o'c = between 1 and 2 o'clock, 12 = at around 12 o'clock (at tegular apex), 3 o'c = near 3 o'clock, "<" = less than, ">" = greater than, "=" equal to.

	OLTMTTHTTKMRICAKMKNIMUUUUMRIBCMPMMMUMCMMMMM UHltdeaklvKwsmAvKigswsllsAalfyweddEslyllEjp TIm111p11RRRcTTTTlTrTTpoUA3sBdR2ACPPPa12Tym	St	CI	RI	Wt	Fit
1 FI shape: slender; thickened & curved	0010110000000000000000000000010000000000000	3	0.33	0.33	1	6.0
2 Patella shape: slender; thickened;	0011101000000000000011000000000000000000000	3	0.33	0.60	2	6.0
3 ♂ TI armature: unarmed; ventral teeth;	0010110000000000000000000000000000000000000	2	0.50	0.50	2	7.5
4 ♂ MtI armature: unarmed; ventral teeth;	0010100000000000000000000000010000000000000	2	0.50	0.50	2	7.5
5 ♂ MtI shape: straight; sinuate;	0000110000010010010001000000000000000000000	5	0.20	0.20	0	4.2
6 ♂ MtI thickness: slender; swollen;	0000000000110010110000000000000000000000100	3	0.33	0.33	1	6.0
7 ♂ Carapace profile: low; domed;	0111111111111111111000111111111100000111111	2	0.50	0.88	4	7.5
8 Carapace length/width: <1.8; >1.8;	0000000000000000000000000000000000110000000	1	1.00	1.00	10	10.0
9 ♂ carapace shape: oval; diamond;	0000000000000000000111000000000010111000000	2	0.50	0.83	4	7.5
10 ♀ carapace posterior margin: truncate; concave;	00?000?0000000000001110000000000000000??000	1	1.00	1.00	10	10.0
11 Carapace dorsal light mark: absent; present;	0000000000000000000000110010000000000000001	3	0.33	0.00	0	6.0
12 Carapace texture: smooth; granulate;	0000011111111111111111111111111111111111111	1	1.00	1.00	10	10.0
13 Tissue around coxae: soft; sclerotized;	0000100001110111000011000000000011111001000	3	0.33	0.85	2	6.0
14 Sternum length/width: <1.15; >1.15;	0000000000000000000011000000000000111000000	2	0.50	0.75	3	7.5
15 Cheliceral promargin teeth: 3; 4;	0110101111111111111111111111101111111111111	4	0.25	0.00	0	5.0
16 Base of ♂ chelicera: convex; protuberance;	0000000010000000000111000010010100000010000	5	0.20	0.33	0	4.2
17 ♂ chelicera anterolateral spur: absent; present;	0010100000000000000000000000000000000000000	1	1.00	1.00	10	10.0
18 Abdomen shape: triangular; round;	0101001101110000000000000001111000000100000	7	0.14	0.45	0	3.3
19 Cuticle around ♂ pedicle: soft; sclerotized;	0111110100000101000111101001001011111101111	7	0.14	0.63	0	3.3
20 ♀ abdomen petiole: absent; present;	00?101?0000001000000100000000000111110??000	5	0.20	0.50	1	4.2

	OLTMTTHTTKMRICAKMKNIMUUUUMRIBCMPMMMUMCMMMMM UHltdeaklvKwsmAvKigswsllsAalfyweddEslyllEjp TIm111p11RRRcTTTTlTrTTpoUA3sBdR2ACPPPa12Tym	St	CI	RI	Wt	Fit
21 Petiole texture: smooth; annulate;	---0-0-------0------0-----------11111------	1	1.00	1.00	10	1.0
22 Annulate petiole: short; elongate;	--------------------------------00110------	1	1.00	1.00	10	1.0
23 Petiole dorsal horn: absent; present;	---0-0-------0------0-----------11000------	1	1.00	1.00	10	1.0
24 Abdominal setae: short & fine; long & coarse;	0001010000000000000000000001110000000100000	3	0.33	0.60	2	6.0
25 ♂ abdomen dorsal texture: soft; sclerotized;	0011100000000000000000000000000011000000000	2	0.50	0.75	3	7.5
26 PC size: greater than RMP; less than RMP;	-111100000000000000000000001000000000000000	2	0.50	0.75	3	7.5
27 RMP orientation: ventrad; distad;	-111100000000000000000000001000100000000000	2	0.50	0.80	4	7.5
28 Tegulum apex: unmodified; EG; AL; enlarged;	0331301112222222222222121122221222222212211	8	0.38	0.50	2	3.7
29 Tegular median lobe (MLT): absent; present;	0000011111111111111111111111111111111111111	1	1.00	1.00	10	10.0
30 Conductor (C): present; absent;	0000100000000000000000000000000000000011000	1	1.00	1.00	10	---
31 C form: undivided; bipartite;	0000-00111111111111111000100000010011001100	5	0.20	0.76	1	4.2
32 C shape: semicircular; T-s; flange; Te; Ha; Pk;	0222-34110000000000000000000050000000000000	5	1.00	1.00	10	10.0
33 C orientation: longitudinal; transverse;	-111-11010000000000000000000010000000000000	5	0.20	0.33	0	4.2
34 C retrolateral surface: smooth; denticulate;	0000-10000000000000000000000000000000100000	1	1.00	1.00	10	6.0
35 Embolus (E) origin: basal; 3 o'c; 1-2 o'c; 12;	0001023332222222333222333333333122222232333	4	0.75	0.94	7	7.5
36 E length: <1.1 rotation; >1.1 rotation;	0010001110000000101000111111110000000010111	2	0.50	0.93	4	7.5
37 Pars pendula: short, inconspicuous; long, thick;	0000011111111111111111111111111111111111111	1	1.00	1.00	10	10.0
38 E curve across tegulum base: even; sinuate;	0000000000000000000000101110000000000000011	1	1.00	1.00	10	10.0
39 E base: simple; with recurved lobe;	0010100000000000000000000000000000000000000	1	1.00	1.00	10	10.0
40 Parembolic process (PEP): absent; present;	0000010111111111111110000000010011011101100	4	0.25	0.80	2	5.0

```
                                                      OLTMTTHTTKMRICAKMKNIMUUUUMRIBCMPMMMUMCMMMMM
                                                      UHltdeaklvKwsmAvKigswsllsAalfyweddEslyllEjp
                                                      TIm111p11RRRcTTTTlTrTTpoUA3sBdR2ACPPPa12Tym  St  CI   RI  Wt Fit
41 PEP form: scler; fleshy; hkd; anvl; arb; Tl; Tk;   -----0-652221023414111-------0--21-111-14--  9  0.67 0.57 3  5.0
42 PEP pustules: absent; present;                     -----0-001111111000011-------0--11-011-00--  4  0.25 0.63 1  5.0
43 PEP basal teeth: absent; present;                  -----1-001111010111000-------0--00-000-01--  3  0.33 0.75 2  6.0
44 Afferent duct (AD): absent; sclerotized; hyaline;  00?111?2211111111111112222222220111111??122  3  0.67 0.92 6  7.5
45 Scler AD: tubular; hemisphere; Ma; Td; Te;         --?234?--1111011101111----------111111??1--  5  0.80 0.00 0  7.5
46 Hemispherical AD size: =HS; >> HS;                 --?---?--0000-011-1010----------000110??1--  5  0.20 0.20 0  4.2
47 Hemispherical AD: simple; with lateral twist;      --?---?--0000-001-1000----------000000??1--  1  1.00 1.00 10 10.0
48 AD apex: near HS; anteriad of HS;                  0-?000?110000000000010111111111-000000??011  2  0.50 0.91 4  7.5
49 Ulwembua hyaline duct: absent; present;            --?---?00-------------111110000-------??-11  1  1.00 1.00 10 10.0
50 Ilisoa hyaline duct: absent; present;              0-?---?00-------------000001100-------??-00  1  1.00 1.00 10 10.0
51 AD Ulwembua lateral twist: absent; present;        --?---?---------------10111---0-------??-11  1  1.00 1.00 10 10.0
52 Epigynal scape (S): absent; present;               00?001?1111111111111111111111111111111??111  1  1.00 1.00 10 10.0
53 Epigynal median hood (MH): absent; present;        00?001?1111111111111111111111110111111??111  1  1.00 1.00 10 10.0
54 S apex: anteriad of MH; posterior margin of MH;    --?--0?000000000000000000001110-000000??000  1  1.00 1.00 10 10.0
55 Atrial furrows: absent; extend behind S;           --?--0?0000001000000001110011010001110??001  5  0.20 0.56 1  4.2
56 Epigynal median lobe: small; expanded posteriorly; 01?110?0000000000000000000000000000000??000  1  1.00 1.00 10 10.0
57 Madagascar Ulwembua epigynum: absent; present;     00?000?0000000000000000000110000000000??010  1  1.00 1.00 10 10.0
58 Ilisoa epigynum: absent; present;                  00?000?0000000000000000000011000000000??000  1  1.00 1.00 10 10.0
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